

Digital Information Centric Platform for Business Enterprise

Marjay C. Bumalod¹, Rose Mary A. Velasco²

¹Isabela State University, Philippines

²Isabela State University, Philippines

Abstract— Information, Education, and Communication (IEC) are essential elements of contemporary corporate organizations that support efficient knowledge transfer and organizational growth. This work uses the design and implementation of a Digital Information Centric Platform (DICP) to provide an innovative approach to IEC and it was developed for a specific business enterprise. To guarantee safe and effective information management within the company, the DICP incorporates Advanced Encryption Standard (AES-128) encryption, Role-Based Access Control (RBAC), and Information Classification. Users are assigned roles according to their duties via DICP's RBAC model, which makes sure they have access to only the data required to complete their tasks. Information classification allows for optimal processing and distribution by classifying data according to its level of sensitivity. Confidentiality and integrity are guaranteed by AES-128 encryption, which protects data while it's in transit and at rest. The PIECES Framework has been used in this research to analyze the satisfaction level of the three respondents; logistics, business development, and head office team. The findings show that DICP demonstrates superior performance, information and data management, economics, control and security, efficiency, and services compared to the present information sharing method of the company.

I. INTRODUCTION

Effective information management and distribution are crucial for organizational success in the digital age. As cited by Fu X. et. al. (2021), effective knowledge transfer sets the stage for applying knowledge, resulting in better decisions and improved work quality. What makes digital sharing platforms unique is their focus on resources and how they encourage sharing activities and collaborative consumption for their users (Anderson & Johansson, 2021). The Digital Info-Centric Platform (DICP) centralizes and streamlines information distribution across staff members while ensuring confidentiality, integrity, and availability. The use of innovative technologies such as role-based access control (RBAC), AES encryption, and an information classification model are also utilized. AES encryption, chosen after winning a NIST competition in 2000, serves as the platform's main security mechanism (Garcia, 2015). By encrypting documents before distribution, the platform safeguards data against illegal access or manipulation, ensuring confidentiality. Centralizing information dissemination offers several key benefits, including improved efficiency and reduced time and effort required to access critical information. Additionally, it enhances security by implementing encryption and access control mechanisms, protecting sensitive information from unauthorized access and cyber threats.

The digital age has led to an overwhelming amount of data that the company is dealing with because of the massive

amounts of information that organizations send and receive, including emails, reports, business transactions, and more. It might be too much to handle this volume. Protecting private and sensitive information is now essential. Data breaches, unintentional disclosures, and unauthorized access can all have unfavorable effects. In a work setting, there can be several difficulties when sharing information via emails, Viber, or other such apps. Among these are security hazards since these platforms are vulnerable to data breaches and hackers that could reveal private information. Data loss is also possible if the device is lost, destroyed, or corrupted. Moreover, the size of files that can be shared on these platforms is frequently limited, and the data that is shared through them is usually saved on individual devices, making centralized access and control challenging. In addition, it can be difficult to manage communication history, retrieve certain information, and integrate with other corporate systems.

The operation mechanism of the library information resource sharing system is centered around technology and resources. The operation technology and storage resources in the operation mechanism serve to support the usage and storage of information resources. The system for exchanging information resources is planned and managed overall by the management mechanism (Xie & Liang, 2021). However, (Mark de Reuver et al., 2017) begin by pointing out that digital Digitization and change will only be successful if management and leadership are dedicated to a digital strategy. The second thing they emphasize is that establishments must have a strong focus on developing and enhancing digital capabilities of their academic staff. Moreover, (Heimburg & Wiesche, 2023) research interest in digital platforms and their economic significance is sparked by the fact that these platforms' procedures allow them to outperform their rivals and that platform owners have more influence on users. Examining the digital platform ecosystem can be clustered in three main perspectives: organizational, technical, and economic. Organizational viewpoint investigates platform management, determine platform involvement, and looks at mutual reliance on platform ecosystems. The technical viewpoint of IS platform research examines design choices made on composition and modulatory concerns in architecture. From an economic standpoint, the IS platform research examines the difficulties associated with multi-sided markets in the context of platforms in three research streams: network effects, pricing and single- and multi-homing.

The primary objective of this study is to develop a Digital Information-Centric Platform (DICP) that overcomes the limitations of using email, Viber, or similar apps for information

sharing in business enterprise. The platform aims to enhance security, improve efficiency, and ensure compliance by leveraging advanced technologies such as AES encryption, role-based access control (RBAC), and an information classification model. The study also aims to achieve the following objectives: implement a document sharing system based on user roles, ensuring that only relevant users have access to specific documents; enable easy tracking of document access and reviews through analytics; Enhance document security by implementing cryptographic encryption to protect against various attacks; Reduce user requests for documents by providing a centralized and easily accessible platform. The DICP is designed to help organizations improve productivity and efficiency while offering convenience to users. In today's data-driven business environment, the DICP serves as a crucial internal communication tool, ensuring that the right information reaches the right people at the right time.

II. LITERATURE REVIEW

According to Abugabah et al. (2009), there has been a significant but perhaps overlooked increase in investment in information systems (IS) over the past decade. Businesses are allocating more resources to information systems, driven by various factors such as the pursuit of increased productivity, improved performance, and enhanced quality. The economic value and fundamental impact of information systems have long been subjects of debate. Many scholars attribute substantial improvements in productivity and overall benefits to information systems. Likewise, in a study by Sardjono et al. (2020) examining the implementation of a Smart Hospital Information System, information was determined as data that has been processed to provide meaningful insights for end-users. The information system is a dynamic arrangement wherein information (data), processes, people, and information technology interact to collect, store, and deliver essential information as output, aiding organizational decision-making processes. Moreover, Chitale (2023) conducted a literature review on the cost-effectiveness of cloud computing in libraries, highlighting its advantages over traditional on-premises systems. These benefits include reduced hardware costs, lower maintenance expenses, and the ability to scale resources according to user demand. Additionally, cloud providers typically manage software upgrades, maintenance, and troubleshooting, allowing library staff to focus on other tasks. Cloud computing also enables libraries to scale resources, ensuring they only pay for what they need, when they need it. This can result in significant cost savings compared to traditional on-premises systems, where libraries often have to end-provision hardware to accommodate highest usage. Data breaches, monetary losses, harm to public trust, threats to brand reputation, and loss of future revenue can all be prevented by implementing data security and integrity measures, according to a study by Duggineni (2023) on the effects of controls on data integrity and information systems. For data security, these precautions include encryption, access controls, backup and recovery methods, version control, audit trails, checksums, and log monitoring. The dependable and efficient operation of systems and vital business operations that depend on data depend on both data security and data integrity. According to

research by Malekani (2023), using Electronic Document Management Systems (EDMS) is crucial for an organization's smooth operation. It makes documents accessible more quickly and efficiently, which improves customer service delivery effectiveness and efficiency. The favorable opinions of the employees surveyed in the current SUA study support this finding. However, Jordan et al., (2022) research emphasizes how crucial it is for businesses and their staff to have specific capabilities in a Document Management System (DMS), especially e-signatures. Significant productivity losses linked to manual document handling are also shown by the study. The highest risk identified is the loss of files (92%), followed by the need to recover missing documents (83%) and time lost in preparing documents (50%). The study also reveals that the most popular cloud services that staff members ask for are content sharing (27%); enterprise content management (20%); IT development (20%); marketing (20%); sales productivity (18%); file sharing (80%); communication (40%); social media (38%), and business intelligence (16%). In a study conducted by Wardhani & Gata (2017) evaluating the services provided by e-learning, the system received high satisfaction ratings. The assessment results indicated that respondents agreed that e-learning can enhance and sustain learning processes, ensuring consistency, completeness, and quality.

III. FRAMEWORK OF THE STUDY

In the IS research framework, the environment encompasses the scope of the problem domain that includes organizations, technology, and people. The business needs capture the problem to be addressed or requirements for the research and to provide design solution artifacts to the environment on behalf of study and evaluation in the application domain. IS Research being the research effort led by applying behavioral science, through the use of theories that enlighten or validate business problems. It adopts the building and evaluation of artifacts designed to meet the identified business need. The Knowledge Base contains all the theoretical foundations, including the research methodologies. That is, it guarantees innovation by providing existing knowledge to the research. The focus is to provide applicable knowledge for IS Research activities and to feedback the updated knowledge to enrich the knowledge base. The IS Research cycle iterates between core activities of building and evaluating the design artifacts and processes of the research. The design cycle is to create, evaluate, assess, and refine design artifacts until a satisfactory design is achieved.

IV. METHODOLOGY

The researcher has gathered through the process of conducting interview, survey, and questionnaires to the respondents. The respondents are randomly selected and divided into three groups which are the development, logistics, and head office team of the company. The questionnaires managed the method 5-point Likert Scale to measure the opinions, attitudes, or behaviors of the respondents. To classify the company problems, opportunities, and information system goals the researcher utilized the PIECES framework as questionnaire criteria which focuses on performance, information, economics, control, efficiency, and services. This framework is conducted on the traditional approach of

information sharing and the DICP to generate an assessment and create findings about the satisfaction of the respondents and their significance using the Analysis of Variance (ANOVA) to determine the significance difference of the three groups.

customer feedback, making sure that our platform satisfied their expectations.

V. RESULTS AND DISCUSSION

Table I shows the comparative analysis of the three respondents; logistics, business development, and head office team across various categories related to performance, information and data, economics, control and security, efficiency, and services. The business development team generally demonstrates higher satisfaction levels, with the highest mean ratings in categories like economics and efficiency. Logistics also performs well, particularly in performance and information and data. However, the head office team tends to lag compared to the other groups showing lower ratings across most categories, especially in information and data, economics, control and security, efficiency and as well as services. Overall, the business development team is the most successful in terms of satisfaction ratings, while the head office team may benefit from improvements in several areas to align more closely with the other teams.

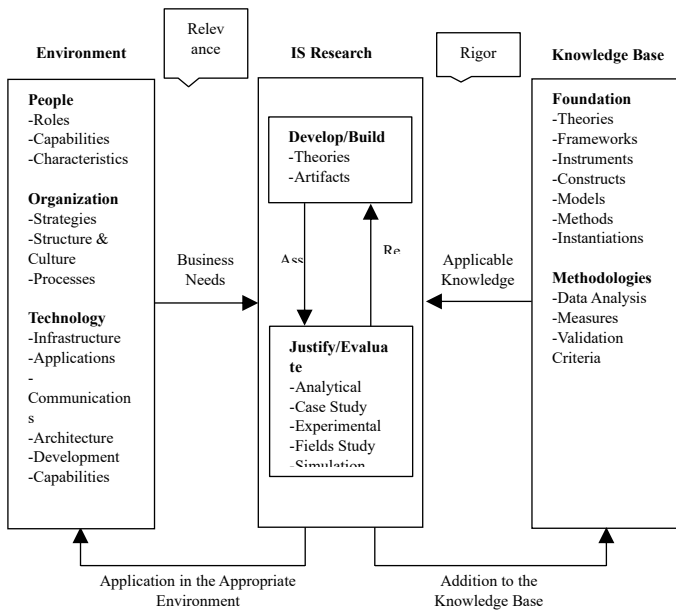


Fig. 1. Information System Research Framework

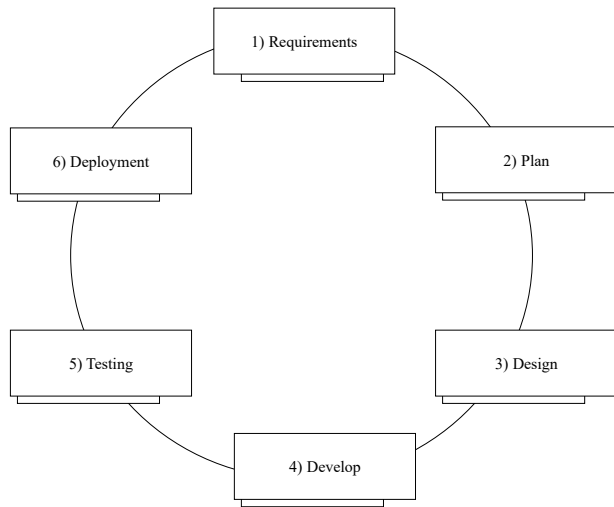


Fig. 2. Agile Methodology

The researcher used Agile methodology in the development of Digital Information-Centric Platform to guarantee adaptability, collaboration, and response to changing needs. In accordance with the Agile Manifesto, the researcher gave priority to people and their interactions over procedures and equipment, functional software over extensive documentation, and adapting to change rather than sticking to a schedule. The researcher used an iterative development strategy where he could provide the users with incremental value through regular sprints. We had daily stand-up meetings to review progress and resolve any issues as well as to break the project down into smaller, more achievable objectives. By using this strategy, we were able to promptly adjust to evolving specifications and

TABLE I. Summary of mean response on the present information sharing method regarding PIECES framework.

Category	Logistics Team		Bus. Dev't Team		H.O Team	
	Mean	Qualitative Interpretation	Mean	Qualitative Interpretation	Mean	Qualitative Interpretation
Performance	3.65	Satisfied	3.9	Satisfied	3.8	Satisfied
Information and Data	3.48	Satisfied	3.88	Satisfied	3.32	Neutral
Economics	3.47	Satisfied	4.13	Satisfied	3.27	Neutral
Control and Security	3.24	Neutral	3.68	Satisfied	2.96	Neutral
Efficiency	3.44	Satisfied	4.0	Satisfied	3.12	Neutral
Services	3.3	Neutral	3.75	Satisfied	2.8	Neutral
W.A Mean	3.43	Satisfied	3.89	Satisfied	3.21	Neutral

Table II provides the results of an ANOVA analysis for different categories (Performance, Information and Data, Economics, Control and Security, Efficiency, Services) across three groups (Logistics, Bus.Dev't, H.O) in the present information sharing method of the company. For the Performance category, the F-test was 1.46 with a p-value of 0.28, indicating no significant difference between the group means. In the Information and Data category, the F-test was 2.03 with a p-value of 0.17, again showing no significant difference. However, in the Economics category, the F-test was 5.79 with a p-value of 0.04, indicating a significant difference between the group means. The Control and Security, Efficiency, and Services categories all showed significant differences between group means as well, with p-values of 0.00 for all three categories. These results suggest that while there are no significant differences in the Performance and Information and Data categories, there are significant differences in the Economics, Control and Security, Efficiency, and Services categories across the three groups.

TABLE II. One-way ANOVA test to find their significant difference in evaluating the present information sharing.

Category	Group respondents	N	Mean	F-Test	P-Value	F-Critical	Interpretation
Performance	Logistics	5	3.65	1.46	0.28	4.26	No significant difference
	Bus.Dev't	5	3.9				
	H.O	5	3.8				
Information and Data	Logistics	5	3.48	2.03	0.17	3.89	No significant difference
	Bus.Dev't	5	3.88				
	H.O	5	3.32				
Economics	Logistics	5	3.47	5.79	0.04	5.14	Has significant Difference
	Bus.Dev't	5	4.13				
	H.O	5	3.27				
Control and Security	Logistics	5	3.24	13.35	0.00	3.89	Has significant Difference
	Bus.Dev't	5	3.68				
	H.O	5	2.96				
Efficiency	Logistics	5	3.44	14.88	0.00	3.89	Has significant difference
	Bus.Dev't	5	4.0				
	H.O	5	3.12				
Services	Logistics	5	3.3	11.45	0.00	4.26	Has significant difference
	Bus.Dev't	5	3.75				
	H.O	5	2.8				

Summary of mean response on the DICP regarding PIECES Table III shows the combined mean answers from the head office, business development, and logistics teams' to the Digital Information-Centric Platform (DICP) show a consistently high degree of satisfaction with all PIECES framework areas. In terms of performance, information and data, economics, control and security, efficiency, and services, the teams gave the platform ratings ranging from satisfied into very satisfied. The Head Office team's much higher rating in the economics area, which indicates a great level of satisfaction with the platform's economic features, is especially remarkable. The weighted average mean ratings show that all teams are generally very satisfied, demonstrating how well the DICP meets the demands of the company and improves information management, security, and efficiency.

TABLE III. Summary of mean response on the DICP regarding PIECES framework.

Category	Logistics Team		Bus. Dev't Team		H.O Team	
	Mean	Qualitative Interpretation	Mean	Qualitative Interpretation	Mean	Qualitative Interpretation
Performance	4.05	Satisfied	4.1	Satisfied	4.1	Satisfied
Information and Data	4.16	Satisfied	4.08	Satisfied	4.04	Satisfied
Economics	4.0	Satisfied	4.00	Satisfied	4.87	Satisfied
Control and Security	4.32	Very Satisfied	4.44	Very Satisfied	4.52	Very Satisfied
Efficiency	4.36	Very Satisfied	4.56	Very Satisfied	4.52	Very Satisfied
Services	4.3	Very Satisfied	4.6	Very Satisfied	4.5	Very Satisfied
W.A Mean	4.20	Very Satisfied	4.30	Very Satisfied	4.30	Very Satisfied

Table IV shows the ANOVA mean test in the Logistics, Business Development, and Head Office teams for the Digital Information-Centric Platform (DICP) in terms of performance, information and data management, control and security, and efficiency do not differ significantly, according to the one-way ANOVA test results. This shows that both teams' perceptions of the DICP are similar in these areas. Nonetheless, the teams' assessments of the services rendered by the DICP range significantly from one another. This suggests that although the

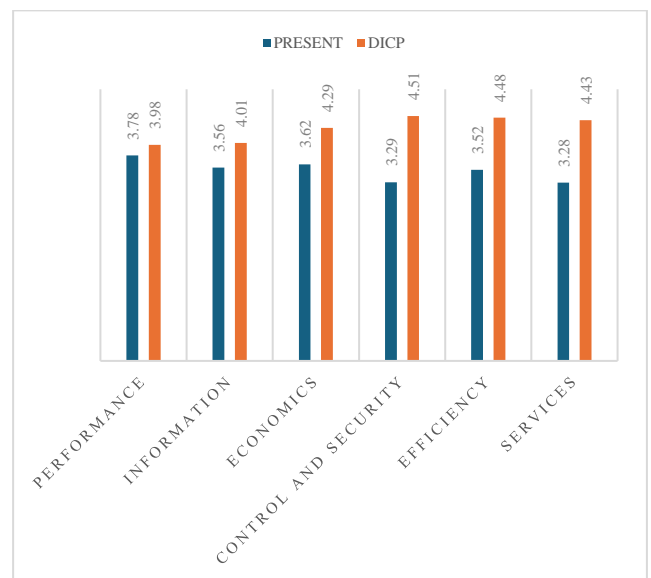
DICP is usually successful in fulfilling the requirements of the company about security, information management, and performance, there can be variations in the teams' opinions of the platform's services.

TABLE IV. One-way ANOVA test to find their significant difference in evaluating the DICP.

Category	Group respondents	N	Mean	F-Test	P-Value	F-Critical	Interpretation
Performance	Logistics	5	4.05	0.16	0.86	4.26	No Significant
	Bus.Dev't	5	4.1				
	H.O	5	4.1				
Information and Data	Logistics	5	4.16	2	0.18	3.89	No Significant
	Bus.Dev't	5	4.08				
	H.O	5	4.04				
Economics	Logistics	5	4.4	4.97	0.05	5.14	No Significant
	Bus.Dev't	5	4.0				
	H.O	5	4.87				
Control and Security	Logistics	5	4.28	0.88	0.44	3.89	No Significant
	Bus.Dev't	5	4.6				
	H.O	5	4.52				
Efficiency	Logistics	5	4.36	0.81	0.47	3.89	No Significant
	Bus.Dev't	5	4.56				
	H.O	5	4.52				
Services	Logistics	5	4.3	4.37	0.04	3.89	Has Significant
	Bus.Dev't	5	4.6				
	H.O	5	4.5				

TABLE V. Comparative Analysis of Present Information Sharing Method vs. Digital Info-Centric Platform (DICP) Across PIECES Framework Criteria

Criteria	PRESENT	DICP	Improvement Percentage
Performance	3.78	3.98	5.03%
Information or Data	3.56	4.01	11.22%
Economics	3.62	4.29	15.62%
Control and Security	3.29	4.51	27.05%
Efficiency	3.52	4.48	21.43%
Services	3.28	4.43	25.96%



In this study, the researcher sought to assess both the current information sharing method and a proposed system, the Digital Info-Centric Platform (DICP), across several key criteria. These criteria include performance, information and data management, economics, control and security measures, efficiency, and the quality of services provided.

In the present information sharing methods, logistics and business development rated a satisfied in most of the categories, while the head office team had a mixed rating, with satisfied ratings in terms of performance, but neutrality ratings in information and data, economics, control and security, efficiency, and services. The findings suggest that while the present information sharing method is satisfied for the logistics, and business development teams, the Head Office team has areas of neutrality, particularly in information and data, economics, control and security, efficiency, and services. Moreover, the results of the one-way ANOVA test show that there are significant differences among the group of respondents in terms of economics, control and security, efficiency, and services. However, there are no significant differences in the evaluation of performance and information or data among this teams. This indicates potential areas for improvement to align the information sharing method with the needs and expectations of all teams. Additionally, the Head office team rated the present information sharing method lower in economics, control and security, and security, efficiency and services compared to the logistics and business development team, suggesting a need for targeted improvements in these areas to enhance overall user satisfaction and effectiveness of the information sharing method.

However, the Digital Info-Centric Platform (DICP), the findings reveal a consistent and positive response from the Logistics, Business Development, and Head Office teams regarding performance, information or data, economics, control and security, efficiency, and services. The DICP was commended for its ability to deliver information promptly, ensure accessibility, provide relevant and clear information, and keep employees well informed about important updates. Additionally, the platform was seen contributing to cost savings, particularly by the Head Office team. Control, security, customization, and confidence in security measures were rated highly by all teams. Furthermore, the DICP was commended for its efficiency in communication, job performance improvement, quick information access, and streamline processes. Overall, these findings indicate that the DICP effectively meets the information needs of employees, enhancing their satisfaction and efficiency in utilizing information within the company. Moreover, the results in the One-way ANOVA test among the different groups of respondents shows there were no significant differences in the ratings for performance, information or data, control and security, and efficiency among the teams. This suggests a consistent perception of these aspects of DICP across the teams. However, there was a significant difference in the ratings for services, with the Logistics and Business Development teams rating it significantly lower than the Head Office team. The significant factors indicating was the composition and characteristics of the labor pool within the company. Different teams have varying skills related to technology and information systems. The Head Office team has more exposure and understanding in utilizing different systems within the company that implies they have better appreciation of the advanced features of DICP, leading to higher ratings for services. Additionally, the Logistics and Business Development teams

have more focused on operational tasks which also influence their perceptions and affect their ratings.

VI. CONCLUSION

The findings from the comparison of the present information sharing method and the Digital Info-Centric Platform (DICP) across the PIECES framework criteria indicate that the DICP outperforms the current method across the areas. The DICP demonstrates superior performance, information and data management, economics, control and security, efficiency, and services compared to the present method. These results suggest that implementing the DICP could significantly enhance information sharing and management within the company, leading to improved efficiency and effectiveness.

VII. RECOMMENDATIONS

Based on the findings, the researcher recommends further research to explore the factors that influence user perceptions of the services provided by the DICP. Additionally, future studies could investigate the impact of user training and support on the perceived effectiveness of these platforms.

REFERENCES

- [1]. Vincent Heimburg and Manuel Wiesche 2023, "Digital platform regulation: Opportunities for information systems research", *Digital platform regulation*, pp 72-85.
- [2]. W. Xie and L. Liang, "Research on Information Sharing System of Digital Library in Cloud Computing Environment," in 2021 *International Conference on Artificial Intelligence, Big Data and Algorithms (CAIBDA)*, Xi'an, China, 2021 pp. 68-71. doi: 10.1109/CAIBDA53561.2021.00022
- [3]. Abugabah, Ahed, Sanzogni, Louis, 2009, "Information Systems and Performance: An analytical approach to understand IS value in business organizations", *International Conference on Information Systems*, pp. 1-9.
- [4]. W Sardjono et al 2020, "Modeling of development of performance evaluation on health information systems Implementation", *Journal of Physics*, pp.1-6.
- [5]. J. Chitale (2023), "A Review on Cost Effectiveness of Cloud Computing in Libraries", *The Online Journal of Distance Education and e-Learning*, Volume 11, Issue 2, pp.1018-1023, <https://www.tojdel.net/journals/tojdel/articles/v11i02/v11i02-06.pdf>
- [6]. AW. Melakani (2023), "Examining the efficacy of Electronic Document Management System and Employees' Perceptions of its Usefulness at Sokoine University of Agriculture", *University of Dar es Salaam Library Journal*. Vol 18, No 1 (2023), pp 112-133.
- [7]. S. Jordan et al., (2022), "Document Management System – A Way to Digital Transformation", *Scienco*, pp. 43-54, <https://intapi.sciendo.com/pdf/10.2478/ngoe-2022-0010>.
- [8]. N.K. Wardhani and Windu Gata (2017), E-Learning Evaluation Using PIECES Framework at Mercubuana University, *Advances in Social Science, Education and Humanities Research*, Volume 174, pp.368-373.
- [9]. Garcia D., "Performance Evaluation of Advanced Encryption Standard Algorithm," in 2015 *Second International Conference on Mathematics and Computers in Sciences and in Industry (MCSI)*, Sliema, Malta, 2015 pp. 247-252.
- [10]. Anderson J. & Johansson R. (2021), Digital sharing platforms: A study of potential barriers for successful establishment, Department of informatics, pp.1-33.
- [11]. Fu, X., Avenyo, E., & Ghauri, P. (2021). Digital platforms and development: A survey of the literature. *Innovation and Development*, 11(2-3), 303-321. <https://doi.org/10.1080/2157930X.2021.1975361>.
- [12]. Mark de Reuver, Carsten Sørensen, Rahul C. Basole (2017), "The Digital Platform", *Journal of Information Technology*, pp 1-21, [pphttp://dx.doi.org/10.1057/s41265-016-0033-3](http://dx.doi.org/10.1057/s41265-016-0033-3)
- [13]. D Duggineni S. (2023), "Impact of Controls on Data Integrity and Information Systems", *Science and Technology*, pp. 29-35.