Enhancing Big Data Security through 3DES Implementation at ATG

**Submitted To:**

Dr. Eyad Taqqiedden

**Submitted By:**

Farouq Hassan

HTU

CRP

**Introduction**

In this world with the increasing of the people numbers from using the internet and that's also with the more availability to the data and the more new technologies that comes out and the more that the user-generated content (UGC) created and the consumers and the new rate that increasing from the different areas, also which need to have a huge store for it and have the ability to process them too, (Kar & Dwivedi, 2020).", and it can be collected from the online forms, email, or even the social media by the researchers, and with numbers that it’s up to 77% from 5 Billion per day a search in the google and the social media the more the comments and pictures, and the status updates with also billions and that is the big data, so the purpose and the objective of it keep changing over the time because it keeps expanding and that means we will have some difficulties to manage the huge amount of data mostly in exabytes. (Rawat, R. & Yadav, R.,2021), and for example for the changes, many cities invest in the big data for the healthcare now and transfer to digital to provide for more good healthier environment, and to add the cloud computing into this field. (Rajabion et al., 2019).

It has a lot of important characteristics and the most important and relative to each other that it called 3V’s and it can’t be handled and the process by one machine or devise and the highest requirements the more it’s going to effect the stakeholders if their needs are high and need a lot of machines, and we should say its one of the most useful things in the big data because this is the solution for many problems as heterogeneous, erroneous, high dimension, and stating with the first from 3V’s is high volume and it’s the Data Size, velocity and it’s the Data incoming and out going Speed, variety and its refers to the Variations and its describes the sources and types of data. (Hukkeri, Goudar, & Kotagi, 2019; Akhmedova, 2020).", and in addition we have 4V’s with Veracity and it’s the reliability and data authenticity. (Rawat, Doku, & Garuba, 2019).", and the 5V’s with value and its gain from the dataset, and the variety can be sorted at semi-structured (have meta-data that describe its structure) and there’s no guarantee it will be in a columns and rows format, structure (form of a schema), or unstructured class and it’s a collection of videos, texts, audios, and it created by persons.(Hariri, Fredericks, & Bowers, 2019)."

Of course, in the big data worlds, the security of transmission, proccing and storge one of the biggest problems on the big data depends on a cybersecurity professionals’ opinions, and there’s many big companies that have been affected by the information leaks that happened from these types of security problems. The transmission into the cloud, and the security of uploading it can be just a loophole waiting to be manipulated by the attackers just like the servers if unencrypted, or the delay on the network transmission, network security vulnerabilities. (Wang et al., 2020).

This research aims, to enhance the security of big data access, for all stakeholders and no leak of information by preserving consumer privacy, and developing innovative solutions to existing security challenges, with a new solution or the same but smooth steps.

**Literature Review**

by Mohan Naik Ramachandra et al. (2022) for this study its implements the Triple Data Encryption Standard (3DES) to increase the data security in the cloud storage for the big data. 3DES, which replaces the normal Data Encryption Standard (DES), now it uses triple-layered encryption to protect the sensitive data against wordly wise cyber threats. so the method balances the encryption strength and the computational efficiency, and its addresses the concerns about the performance in handling a large volumes of data.

by Jiaxing Li et al. (2020) so this research mix the blockchain technology to form a public auditing scheme. so it focuses on creating the tamper-proof systems for the cloud storage by using the blockchain's fixed ledger to clarity and securely verify the data integrity. even with all its efficacy, the study notes the challenges in the scalability and the processing speed inherent in the blockchain calculations, and very for the larger datasets.

by B. Alouffi et al. (2021) Alouffi et al. undertake a systematic review to analyze existing cloud computing security threats and strategies. They collate and synthesize data from various academic sources to provide a broad perspective on the evolving nature of cloud security challenges and the corresponding mitigation strategies.

by Si Han et al. (2019) This paper proposes a secure data-sharing protocol, Secret Sharing Group Key (SSGK), particularly relevant in cloud-enabled IoT environments. The protocol employs a mix of symmetric and asymmetric encryption algorithms, coupled with a secret sharing scheme, to distribute a group key among authorized users. It focuses on hybrid encryption frameworks, suitable for multi-cloud environments.

by Lo'ai A. Tawalbeh et al.(2021) its provide an in the depth analysis of the security and the privacy challenges in the cloud and the mobile cloud systems, and with weight the use of the peer-to-peer (P2P) technologies and that's for enhancing the security for it. also the study suggests novels solutions to address the specific vulnerabilities of these systems and calls for more from research into the user-friendly security interfaces.

by Uma Narayanan et al.(2022) it developed a novel authentication architecture for the cloud-enabled for the big data environments. and also they introduced the Secure Authentication and the Data Sharing in Cloud (SADS-Cloud) system, means employing the SHA-3 for the user registration and the MapReduce with the SALSA20 encryption for the data security, and all that alongside with LZMA compression and the DBSCAN clustering for an efficient data management.

by Viswanath, G. & Krishna, P.V et al. (2021) in this study its presents the hybrid encryption algorithm and that's designed to add to the security in the multi-cloud systems. so this methodology combines the processes for the uploading, slicing, indexing, encryption, dissemination, decryption, retrieval, and merging of data. It confirms a lot about the creation of a hybrid encryption algorithm to combat the insider attacks and the validate for its effectiveness through the simulation in a real-time in cloud storage settings.

also at the end as a summary of these studies, its all shows an overall perspective on the protection of cloud computing come out, and with an the attention on the encryption, blockchain technologies, and the development of protocols to protect the data sharing and the access in cloud-based systems. And the review also identifies the research gaps and its confirms the needs for the dynamic and scalable security measures, with bring out the chances for the future research in advanced technologies alongside with traditional security protocols.

**Research Objectives:**

A study to evaluate ATG's company prepare to adopt and implement this specific data encryption technology (3DES) for enhancing its big data security during transmission, processing, and storage

**Research Question:**

1. How prepared is ATG's workforce in terms of skill sets and knowledge to adopt and efficiently utilize (3DES) for enhancing big data security?
2. How will the implementation of (3DES) align with ATG's strategic goals, and what operational impacts (both challenges and opportunities) can be anticipated from this transition?

**Research Methodology**

My research explores the preparation of ATG to adopt the Triple Data Encryption Standard (3DES) for enhancing big data security. To ensure an overall understanding of it, it's important to analyze the qualitative, and the quantitative, and mixed methods helpful to my research.

1. Qualitative Methods

The qualitative research its focuses on the understanding of the human experiences and the social facts, depend in the depth vision over quantifiable data. means it would be very useful for surveying personal runs and understanding of ATG employees via 3DES. This could involve mostly lead an interviews or focus groups to gather accurate feedback and data on their understanding, worry , or trust about 3DES implementation. also the Data Collection Can include put open-ended survey questions on it, and interviews, and focus groups. The analysis be Thematic analysis or content analysis to explain the data and spot the themes or patterns in the responses it got.

1. Grounded Theory:

this will Involves developing a theory based on the data that have been collected. It's exploratory and interpretive, and focusing on the understanding of the participant experiences and view. this could provide more deeper vision into the personal experiences and the opinions of the ATG employees regard to cybersecurity and data encryption. The philosophical position it set with constructivism, where truth is seen as subjective and co-constructed by individuals. so It has some of the limitations like the Time-consuming and it may not provide the generalized, snd the objective data that it needed for assessing the prepare across the company.

1. Case Studies:

In the depth study of a the particular case in point or case within its real-life context. this could offer a detailed vision of the specific instances of the cybersecurity challenges or the successes within the ATG company. so often line up with interpretivism, focusing on understanding the twist of the human behavior in context of that. This may not provide enough data for the general organizational change choices and decisions.

1. Quantitative Methods:

in the quantitative research its involves the collecting and the analyzing numerical data to identify the patterns, and test hypotheses, or make the predictions. This methodology is ideal for quantifying the ATG employees' understanding and the prepare for implementing the 3DES in the big data security. so it allows for the correct sizing of many factors like the level of knowledge about the 3DES, the recognize for prepare of the company's infrastructure, and for the workforce's adaptability to this new technology there. for about the Data Collection method, its surveys, and it is the primary tool for the data collection. The survey includes design questions in formats like the Likert scales, and multiple-choice, and yes/no questions. so the Analysis for it is a statistical analysis to quantify the responses, such as calculating the percentages, and averages like using Excel, or presenting data in charts and the graphs for clearer vision of findings. Can use Online Platforms, to use online survey tools for logical distribution and response collection, like Google Forms.

1. Survey:

this method is collects a numerical data from a the sample representative of the population through the build form. its efficient for gathering a specific information’s from a large number of employees with regard their knowledge and the belief towards the 3DES. its line up with positivism, where the reality is objective and can be quantified and be measured. it provides a clear, and quantifiable data that can be statistically analyzed from it, its necessary for evaluating the prepare for the technological implementation on an organizational level.

1. Experimental Methods:

this involves the manipulation of the variables to notice the effects on a subject variable, a lot in the controlled settings. also It could be used to test a specific hypotheses about the use of the different cybersecurity protocols or the training methods. fixed to in positivism and the realism, and focusing on cause-and-effect relationships. This may be unsuitable in my context, for given the complexity and ethical considerations of the experimenting in a real-world business environment.

1. Mixed Methods:

the mixed methods it join in the qualitative and the quantitative ways to power the stability of both methods. so this approach can provide a more overall and more understanding of the research topic. And that's by combining both the qualitative and the quantitative data, and it can gain from both the statistical shifts and the in more depth vision that is needed for a holistic understanding of ATG's preparation for the 3DES implementation. so the Data collection on it, is a union of the surveys (the quantitative) and the interviews or the focus groups (the qualitative). so the analysis on it, is a united analysis where the qualitative vision explains or adds the quantitative findings.

the quantitative Survey is a research method that it collects numerical data from a sample of the population to reason the liking, the behaviors, or the features of a larger groups. so this method uses a shape survey with a closed-ended questions to gather the quantifiable data, which also can then be statistically analyzed later.

so the quantitative surveys can be helpful for gathering the specific, the measurable data on the employees’ knowledge, and skills, and the attitudes toward this technology. so given the small size of the ATG's staff, surveys will enable the data collection from a small sample, that will ensure an overall of the understanding of the company’s preparation for it. And so it offers a more objective analysis as it depends on the numerical data, which that will reduce the researcher's bias. and somth easy analysis of the datasets, which is a key in the organizational settings like ATG. It is also practical, given the limitations of the time and the resources. And it provides clear, and short, and direct answers to the research questions, and it focuses on the 'what' rather than the using of 'how' or 'why'. so the numerical data that taken from the surveys can be statistically analyzed to know the trends, and the patterns, and the correlations, means providing solid evidence to inform the decision-making. and also surveys ensure standardization in the data collection, that allowing for consistent responses across a small or large number of participants. This regularity is major for the comparing data across the different departments or the groups within ATG. and surveys can be easily scaled up or down and that's depending on the size of the target of the population, and making them flexible for different research scopes.

1. ATG's workforce’s current understanding and skill level as for 3DES.d
2. The running impacts, both challenges and opportunities, expect from transitioning to 3DES.

In this research project its exploring the ATG employees' preparation and the angle towards the effecting of the Triple Data Encryption Standard (3DES), so the chosen research philosophy is Interpretivism. and this approach is particularly relevant as it focuses on the understanding of the personal meanings and social contexts within which the employees use, and admit the complication of the human experiences and the perceptions. This philosophical stand is an kay for scout the accurate views of the individuals and it is major for a fully follow the impact of the 3DES within the organizational context.

and to form the investigation method, a deductive research approach is employed, that will be allowing for the development of the hypotheses based on the existing theories or the vision into it, which are after it tested through the actual review. even with the Interpretivism often leaning to towards the inductive logic or reasons, the deductive address is applied within the case study research to explore and to test the applicability of the theoretical concepts in the specific on organizational settings, and its such as ATG's odd feel about 3DES implementation.

for the research strategy that have been chosen for it, is the case study research, its providing an in the depth analysis of the ATG's specific case of the 3DES implementation on it. This strategy place with the Interpretivist philosophy by enabling an overall study of the complex of social dynamics, and the employee understandings, and the organizational culture that surrounding the 3DES. so through the case studies, and the detailed check of the specific sample within the organization are ease, and offering an accurate on an understanding of how the implementation is take it in and make it by different stakeholders.

and so the research employs a mono method that focusing on quantitative data to ensure the lack of changes, and the reliability, and the ability to generalize the findings across the ATG's workforce. so this method is supports the objective size and the statistical analysis of the data that related to the employee for the prepare for the 3DES, and its aiming to quantify the aspects within the case study such as the currency of certain perceptions or the frequency of the identified challenges on it.

and a cross-sectional design is used to capture a the snapshot of the employee perceptions and the organizational conditions at a single point at a time, well very to the point for the assessing the current state of the prepare for the 3DES implementation. This design proves the effective for the case study research, and the focusing on in the depth for exploration within a known timeframe.

so for the data collection for this research is managed by the primary research that is using online surveys for it, and these have been chosen for their order to reach a wide audience within the ATG. So the analysis of this data it will be easier by using the statistical software like the Google Forms, this will be allowing for the pointing of the patterns there, and the trends on it, and the like in the data.

**My methodology would be summarized in a flowchart as follows:**



1. Defining Research Objectives and Questions: need to outline the specific aims and inquiries of the study.
2. Survey Design: start on develop a structured, quantitative survey to collect data on employee preparation and understanding regarding the 3DES.
3. Survey Distribution: use online platforms to distribute the survey to ATG employees.
4. Data Collection: Gather the quantitative data through the completed surveys.
5. Data Processing: Organize and prepare the survey data for analysis.
6. Data Analysis: Use statistical analysis to examine the survey data, focusing on identifying significant patterns and vision related to the research questions.
7. Interpretation of Results: Interpret the statistical results in the context of the study's objectives.
8. Reporting Findings: Compile the findings into an overall report, emphasizing key statistical vision.
9. Recommendations and Conclusion: Based on the analysis, provide specific recommendations for ATG to enhance workforce prepared for 3DES.
10. Reflection and Future Research: Reflect on the methodology and findings, suggesting avenues for future investigations.

as a summary for the flowchart above for the research project that I used a structured quantitative approach to evaluate the ATG employees' capability and the understanding of the Triple Data Encryption Standard (3DES). We have the process begins with the defining the specific research objectives and questions, followed by the design of a structured survey. next this survey was distributed to the ATG employees using the online google forms, which make it easier for the collection of quantitative data. The gathered data were good organized and prepared for the statistical analysis, and focusing on identifying specific patterns and visions that connect or relate directly to the research questions. next explanation of these results was collected within the context of the study's objectives, that leads to the final report that highlights key statistical vision. Based on the analysis, specific recommendations were made to enhance workforce prepare for 3DES at ATG. then offered some reflections on the methodology and findings, laying out suggestions for future research.

**Data Collection and Analysis**

**Data Collection**

Primary Data: the primary data its the data that have been collected direct from a first hand, in this research involve of the responses collected through the quantitative surveys that have been distributed among the ATG's workforce. and this data directly relates to the employees' perceptions, and the understanding, and prepare as for the adoption of the Triple Data Encryption Standard (3DES) for enhancing big data security. The primary data source is the survey responses from the ATG employees.

Secondary Data: Secondary data its the data that has already been collected through primary resources and it has been available for the others to use it, and this includes the academic papers, the literature reviews, and the industry reports that discuss the big data security challenges, the encryption technologies, and their implementation in organizational contexts. These sources provided a theoretical base for the research, and its offering a vision into existing solutions and the importance of the encryption for data security. Specific references this include works by Mohan Naik Ramachandra et al. (2022), Jiaxing Li et al. (2020), and other cited studies within the literature review section.

for assessing the ATG's direction to adopt the Triple Data Encryption Standard (3DES) for enhancing the big data security, so the research methodology it surrounds a quantitative survey approach, that also requires thorough review of the access and the ethical issues, with alongside an the evaluation of the merits and limitations inherent in such a research strategy.

for the access Issues it came across the primarily that involved securing permission from the ATG to survey its employees, so it was a very critical step that was required a careful coordination with the organization's management to send it. for achieving the overall participation across a various departments and experience levels was urgent for the representative analysis, yet the give out challenges in the ensuring good and unbiased engagement.

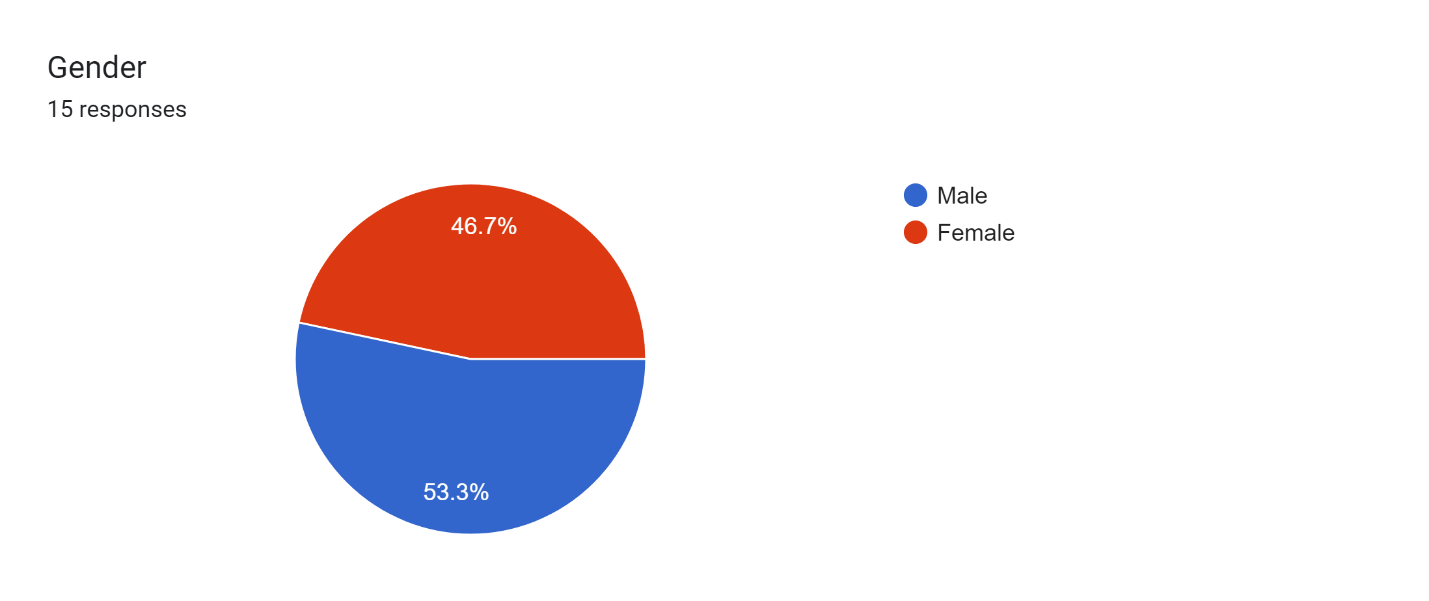
for the ethical Issues that it was addressed with the task to confirm the high ethical standards throughout the research process. so, this commitment involved ensuring that the anonymous and the confidentiality of survey respondents, it was a base of the ethical research. and the participants were fully informed about the research's purpose, and their rights to withdraw at any time, and the specific use of their data, that ensuring informed consent and the respecting participant auto on me.

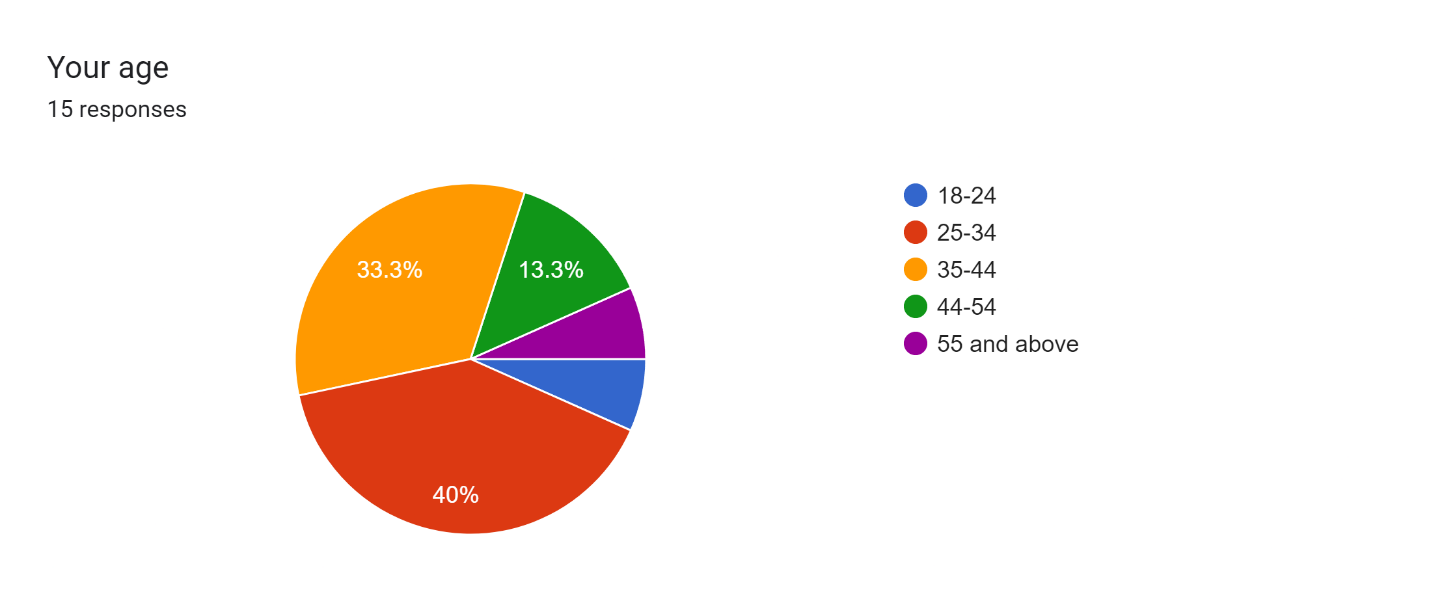
and for the merits of the quantitative survey method that’s including the ability to gather data efficiently from a significant part of the ATG's workforce and offering a generalized shot of the preparation and the perceptions in re 3DES. so this approach ease the objective analysis of the collected data through the statistical methods, and enabling a clear, numerical vision into the trends, and patterns, and correlations. The arranged quality of the survey organized the analysis process, that means it allowed for a larger generalization and the relative bench marking against the industry standards. However, the limitations have also been noted, starting from including the potential for the response biass, where participants they might offer socially wanting answers a bit than their true opinions. Additionally, so the survey's design, it was extra its trust in on the closed-ended questions, which might be a limit the depth of the responses for sure and require the search of the accurate opinions or the detailed feedback.

and for the tools that used for the data Collection and Analysis it played a key role in the research process. as used the online survey programs (Google Forms) it was looked to for its their efficiency in the distributing the survey and for collecting the responses, while the data analysis was managed using a software (also Google from, Summary). so these tools were supported the organization, visions, and the explanation of the survey data, and making it more smooth for the calculation of frequencies, and the percentages, and the averages critical for assessing the workforce prepare and the notices.

and given the view of 'Goodness' of the Data, so the research's kind to the ATG's prepare for the 3DES and that's was to ensured that the findings were so directly to the point and on the action for it. so the quantitative data it allows an objective analysis on it, and its offering a clear vision that was involved in drawing up the advice it needs, so and there were the challenges of gain the right respondents and the built-in risk of the response of bias that has been confirmed that from the complication of control the quantitative survey-based research, and its covering the note of overall and ethical good and safe research practices on it.

**Data Analysis**



this is shows a balanced gender representation that is ensuring a range of viewpoints in the answers, which is also a important for an overall rating of the ready of the workforce in there. so this analysis shows that the ATG has a reasonable balanced age giving out, and also with an important representation from the age groups that are typically can be more flex to the technological changes (Most respondents fall within the 25-44 age range (73.3%), and the is shows a relatively young and maybe tech-intelligence workforce.). and this could simply impact their adaption to the new technologies like the 3DES. and so this demographic layout it can be effect the plan for the training and the implementation of the 3DES, means it will ensuring that they are tailored to put up the mixed it needs and the capabilities of the workforce.

(so these demographics it provides a context of the workforce's likely adaptability and the accept to the new technologies.)

Forms response chart. Question title: Department
. Number of responses: 15 responses.

in this one the majority (46.7%) are from the IT and Technical Services, which is relevant because it since this group is likely to be the ones who are directly involved in the implementation and the management of the 3DES. so the vision from the other departments gives a wider outlook on how the implementation might impact the organization as a whole.

Forms response chart. Question title: Years of Experience in the Company
. Number of responses: 15 responses.

in this, a there a considered representation from the employees with 4-10 years in the company (60%), and that indicates a workforce with the real experience and who understanding of the company’s actions and challenges.

the vision from a difference of the departments, especially those who with the considerable experience, it means offering an overall view of the probable organizational impacts of the 3DES implementation.

Forms response chart. Question title: Role in Data Security
. Number of responses: 15 responses.

so 40% of it, is directly involved in the data security and 33.3% is sometimes involved, that means suggests a serious part of the survey participants are learned about the data security affair, and that which is related to the adoption of 3DES.

Forms response chart. Question title: Familiarity with Encryption Technologies
. Number of responses: 15 responses.

the high familiarity with the encryption technologies (86.6% somewhat or very familiar to it) and is a positive sign for the workforce's ability to adapt to the 3DES.

so for these factors that are directly linked to the first research question about the workforce readiness. so with that a workforce that already is familiar with the encryption and also engaged in the data security activities would likely be more able at adopting and utilizing the 3DES.

Forms response chart. Question title: On a scale of 1-5, how would you rate your current understanding of 3DES and its application in big data security? (1 is the lowest, 5 is the highest)
. Number of responses: 15 responses.

on this one, it has a stable distribution between low (20%), the moderate (26.6%), and the high (66.6%) for the understanding levels suggesting a mixed level of the skill with the 3DES with the among of ATG employees. so this means diversity in knowledge levels makes out the need for the tailored training programs that cater to the different levels of the earlier knowledge at there.Forms response chart. Question title: Have you previously worked with 3DES or similar encryption technologies in a professional setting?
. Number of responses: 15 responses.

and here with 60% of respondents that having a good experience with the 3DES or a similar technologies for the encryption, and ATG seems to have a hard base of the expertise to build in. also this experience can help smoother implementation for it, and peer learning, and mentorship, and the enhancing of the overall adoption action. This also directs the workforce preparation aspect for my objective.

for these, the general understanding and the previous experience with the encryption technologies between the workforce and that It directly notifies the first research question about workforce preparedness.

Forms response chart. Question title: Do you believe additional training is required for effectively implementing 3DES in our company?
. Number of responses: 15 responses.

so in this one it has almost the half for both, its a close split between the needing for additional training (40%) and the not needing it (46.7%)and that indicates the levels of the confidence and the skill sets out of the employees, but its also a workforce that is somewhat that confident yet it admit the value of the far education. so it advice the need for an optional, but overall, training programs. and this is a key for my first research question about the workforce readiness.Forms response chart. Question title: What type of training formats do you prefer for learning about new technologies like 3DES?
. Number of responses: 15 responses.

and for this the preference is hand out quite closely across the workshops, and the online courses, and the hands-on sessions. this high point is the desire for the mixed training formats. and this shows and mark a need for a hybrid training near, and combining the self-paced learning with the interactive and the practical sessions. this diversity should be taken in the learning taste and should be considered when it designing the training programs for the 3DES implementation.

this shows the need for any type of the training, and the questions that provides the vision into how the best to be prepare the workforce, and which it is a key for the effective implementation of the 3DES.

Forms response chart. Question title: How well do you think the implementation of 3DES aligns with ATG&apos;s current strategic goals?
. Number of responses: 15 responses.

and here a serious most of them (80%) tell that the implementation as lines up with ‘very well’ or ‘moderately well’ with the ATG's strategic goals, helpful good support and the understanding of the energy that link to the company's objectives. and this is addressing my second research question about operational impacts and the alignment with the strategic goals.Forms response chart. Question title: In your opinion, what are the potential benefits of implementing 3DES at ATG?
. Number of responses: 15 responses.

and the responses here is point up on the enhanced data security (40%) and the improved protection against cyber threats (33.3%) as its the primary benefits of the implementation. for this its set well with the strategic goal of the feed the big data security in the company.

and also the alignment with the strategic goals and the expected benefits, and that the questions that relates to the second research question about the operational impacts and the strategic alignment.

Forms response chart. Question title: What challenges do you expect might arise from the transition to 3DES for data security?
. Number of responses: 15 responses.

Challenges identified (like training needs) reflect a realistic appraisal of the potential hurdles in implementing 3DES. These vision can guide the management in proactively addressing these challenges. And it directly relates to both my research questions, especially concerning workforce prepare.

Forms response chart. Question title: How prepared do you feel our current infrastructure is to support a smooth transition to 3DES? (1 is the lowest, 5 is the highest)
. Number of responses: 15 responses.

and for the responses here its shows a quite of the high level of the prepare on it, with an unusual bit rating of 4 or 5. and this would suggests that's the ATG's infrastructure is relatively fit for the transition, and this also suggests that while the upgrades may be needed into there, but the foundational systems are there largely in the place. this is very important for evaluating the value of the 3DES implementation in line with my objective.

On these ones, the expected challenges and the infrastructure to prepare it, the questions focus on the future difficulty and the prepare levels, in part to both my research questions.

Forms response chart. Question title: Do you feel confident in your ability to adapt to the new 3DES technology for enhancing data security? 
. Number of responses: 15 responses.

and with the high rate here of the confidence (66.7%) with the among of the employees, so it seems that the workforce is mainly is ready and be willing to adapt to the 3DES, which is a lot encouraging for the planned changes.  
Forms response chart. Question title: What resources or support do you think would be most beneficial for employees to adapt to 3DES?
. Number of responses: 15 responses.

and the responses here are major for the planning for the effective training and to the support strategies, and also the dealing out of the priority for resources that spotlights the demand for the overall and the mixed learning supports, and thats reinforcing the need for a the multi faced approach to the training and to supports, and which ensuring that the workforce is well-prepared to utilize the 3DES effectively.

and for the last two ones, it was the confidence in adapting to the new technology for the Q9, and the like better for the resources/support for the Q10, and for to further explain for the workforce's preparation and the type of the support it needed for it, and with all this its tying back to my research objective.

**Analysis of Findings:**

For the workforce skill set and Knowledge Prepare:

so the advanced encryption methods like the 3DES are a key but its required a special understandings and skills for the effective implementation for the company, as it noted in studies about the cloud security and the data encryption before in the literature.

for the survey findings, While there is a fair level of the familiarity with the encryption technologies between the ATG's staff, it shows organize and keep with the industry trends out there. so the survey shows a need for the further training, and particularly in the 3DES. This set with the literature, and suggesting that on going for the education and the skills development both are critical for change to develop the cybersecurity technologies.

and for the alignment with the strategic goals and Technological Trends and Infrastructure:

in the Literature, the transition of the encryption technologies like the 3DES is not only a technical challenge but its also a necessary strategic decision, that affecting many in action aspects of an organization.

for the survey finding, the majority of the respondents believe that the implementation of 3DES line up well with the ATG's strategic goals, and that reflects a company-wide admission of its importance, similar to the trends that has been identified in the literature. and its ring with the literature’s view on the growing importance of the data encryption in the business strategies on it. so as it need to be about the infrastructural prepare and light the need for the strategic planning and the share in the technological upgrades.

for the operational Impacts and Adaptation Challenges:

back in the Literature, the Challenges in compatibility, the scalability, and the performance are usual when adopting a new encryption technologies, and transition on to an advanced security rate and it often comes with the challenges such as system similarity issues and the need for infrastructural changes, as it were identified in the literature.

for the survey finding, the responses were show some concerns about the compatibility, and the system performance, and the infrastructure prepare and echo these challenges. so it need to an expectation of these issues at the ATG is consistent with the big challenges that will be faced by many organizations that is upgrading their security systems, as discussed in the academic sources before.

for the potential Benefits and Risks Assessment:

on the Literature, to enhanced the data security and improved the safety against cyber threats are the primary benefits of using 3DES, but also theres are some risks and a challenges need to be considered, thats such as the potential drop in system performance.

for the survey finding, its the respondents' that recognition of the benefits of the 3DES on it, thats including the enhanced security and the protection against the cyber threats, and this is line up with the literature. and as their concerns about the system performance and the efficacy against current threats its reflect a logical evaluation of the risks involved from it, this is also similar to the warning notes that have been found in the academic studies.

for the training and Support for Effective Implementation:

on the Literature, so successful implementation of the security technologies like the 3DES it requires an overall training and a support, as point it in there.

so on the survey findings, so the preference there for a detailed training sessions, and the online resources, and the workshops means it show an understanding among the ATG's workforce of the need for great training to adapt to the 3DES effectively. so this mirror the literature's mark on the importance of the training for a successful technology implementation.

**Addressing Research objectives:**

on the survey findings at the ATG it shows a note level of the workforce ready in the terms of the basic knowledge and the skills that is related to the encryption technologies, this is including the 3DES (average rating above 3). and as it mentioned on it, there's a significant part of the respondents that have been earlier experience with a similar technologies, and means that suggesting a foundational prepare on some. However, there's the point out that it needs for an additional expert training on it and liking for the hands-on sessions that show a gap that needs to be filled for the effective implementation on it there. so this marks a prepare to take on the 3DES but that's also pick out the need for the aim of training to fully prepare the workforce for it. and as it shows by the mixed responses as to the familiarity and the trust in the adapting to this technology. so this position goes well with the literature review, which asserts the importance of that get employee training and the skill in implementing the advanced encryption methods for the big data security.

so the survey results suggest that the implementation of the 3DES at ATG is largely seen as a place with the company's strategic goals, and that's especially in the enhancing of data security and protect against the advanced cyber threats. also, this shows an awareness of the importance of the enhanced data security inside the company’s strategic body. They also, they expect the challenges such as the compatibility with the existing systems, and the need for the infrastructural upgrades, and the potential impacts on the systems performance. and also, these findings be reflect the literature's mark on the need of to balance the security rise with the running use. Yet so the high confidence in the adapting to the 3DES and the recognition of its their benefits (like enhanced the security and the stakeholder confidence) it suggests for a positive view toward control of these challenges. and these worried echo on the literature's focus on the balances between the security improvements and up and running use, and usually in the context of the big data environments. and also, it can be said that the execution of the 3DES at ATG put in order with the strategic goal of the enhancing the data security. However, also the company it must to address the operational challenges that have been identified in the survey earlier, which are also supported by the literature, and that's to ensure a successful transition.

**These are some key recommendations and their justifications, based on the analysis and findings:**

1. **Tailored and Overall Training Programs**

so need to develop and implement a series of tailored training programs on the 3DES for a different levels of the staffs, and then convert it from the basic starting courses to the advanced workshops for those who have a more experience in the encryption technologies. The survey shows a mixed level of the familiarity with 3DES or other technology, and its a clear need for the additional training. the tailored programs will be ensure that all the employees, any way of their current knowledge level, and receive the suitable education to effectively use the 3DES. so this is reach set with the literature's mark on the importance of the continuous education and the skill development in fast open out fields like cybersecurity.

1. Strategic Infrastructure Assessments and Upgrades

need to conduct an overall assessment of ATG’s current IT infrastructure so can be identify the areas that needing upgrades or the changes to support the effective implementation of the 3DES. and some worries have been about the infrastructural prepare and the compatibility issues with the existing systems were shown in the survey. so proactively finger and addressing these infrastructural gaps is crucial for the smooth transition to the 3DES, and as confirmed in the literature that rubs in the importance of the technological prepare in implementing the advanced security measures.

1. Regular Feedback tools and Continuous Improvement

need to establish a regular feedback tools to gather the vision from the employees all over the execution process, and to use this feedback for the continuous improvement. so also the continuous feedback will allows for a real-time adaption and to helps address any pop challenges or the concerns that its during the transition to the 3DES. so this approach place with the best use in change of the management, and it is a key for keep the workforce engaged and to be ensuring from the successful taking of new technologies.

1. Increase the focus on Risk Management and Performance improvement

need to develop a risk management plan that specifies of addresses the likely risks linked to with the implementation of the 3DES, and that's is such as the reduce of the system performance, and outlines the strategies for the relax for these risks. so the survey responses has shown a worry about the system's showing after the implementation. so for that a focused risk management plan will for sure be helpful in a pre-emptively and then identifying and qualifying the possible issues for it, that will ensuring the security rise does not safely slow the going efficiency. so this recommendation is in line with the literature vision that stresses about level the security improvements with the operational feasibility.

1. communication and alignment with the strategic goals

need to start implementing an overall relay strategy that will focuses on the range of the 3DES implementation with the ATG’s strategic goals and the overall good for the organization. and also on it the majority of the survey respondents they saw that the implementation of the 3DES as it sets with the company's strategic goals. and its too do of use communication holds up the strategic value of this push on there, and boosts the employee spirit, and it will ensure that the organization it support for the transition. and this strategy is important for ensuring that all the staff will understand the value and the need of the change, as it noted in the change management literature.

1. contact inside expertise and peek Learning

so first identify and use inside employees who have a good experience with the 3DES or the similar technologies to act as mentors in the implementation task for their coworkers. that's because with 60% of respondents that having a good experience with the 3DES or the close technologies, so use this inside skills can make it easier and smoother for the implementation and help the culture of peer learning there. and this reach is supported by the literature that focused on the benefits of utilizing internal resources for the knowledge sharing and the capacity building in the technological transitions.

**Resources**

Paper 1:

Rawat, R. & Yadav, R. (2021). Big Data: Big Data Analysis, Issues and Challenges and Technologies. IOP Conference Series: Materials Science and Engineering, 1022(1), 012014. <https://doi.org/10.1088/1757-899X/1022/1/012014>[Accessed: 19 November 2023].

Paper 2:

Akhmedova, N. (2020) 'A study of security problems in big data and their solutions', Chemical Technology, Control and Management, 2020(4), Article 13. https://ijctcm.researchcommons.org/cgi/viewcontent.cgi?article=1172&context=journal [Accessed: 19 November 2023].

Paper 3:

Kar, A.K. & Dwivedi, Y.K. (2020) 'Theory building with big data-driven research – Moving away from the “What” towards the “Why”', International Journal of Information Management, 54, 102205. <https://doi.org/10.1016/j.ijinfomgt.2020.102205> [Accessed: 19 November 2023].

Paper 4:

Hukkeri, G.S., Goudar, R.H., & Kotagi, P.R. (2019) 'Handling 3vs of Big Data Through Swarm Intelligence', in 2019 4th International Conference on Recent Trends on Electronics, Information, Communication & Technology (RTEICT), Bangalore, India, 2019, pp. 589-595. https://doi.org/10.1109/RTEICT46194.2019.9016846 [Accessed: 19 November 2023].

Paper 5:

Hariri, R.H., Fredericks, E.M. & Bowers, K.M. (2019) 'Uncertainty in big data analytics: survey, opportunities, and challenges', Journal of Big Data, 6, Article number: 44. https://doi.org/10.1186/s40537-019-0206-3 [Accessed: 19 November 2023].

Paper 6:

Rajabion, L., Shaltooki, A.A., Taghikhah, M., Ghasemi, A., & Badfar, A. (2019). 'Healthcare big data processing mechanisms: The role of cloud computing', International Journal of Information Management, 49, 271-289. https://doi.org/10.1016/j.ijinfomgt.2019.05.017 [Accessed: 19 November 2023].

Paper 7:

Wang, J., Yang, Y., Wang, T., Sherratt, R.S. & Zhang, J., 2020. Big Data Service Architecture: A Survey. Journal of Internet Technology, 21(2), pp. 393-406. Available at: https://jit.ndhu.edu.tw/article/view/2261/2274 [Accessed: 19 November 2023]. DOI: 10.3966/160792642020032102008

Paper 8:

Ramachandra, M.N., Rao, M.S., Lai, W.C., Parameshachari, B.D., Babu, J.A. and Hemalatha, K.L., 2022. An efficient and secure big data storage in cloud environment by using triple data encryption standard. Big Data and Cognitive Computing, [online] 6(4), p.101. Available at: https://www.mdpi.com/2504-2289/6/4/101 [Accessed: 23 December 2024].

Paper 9:

Li, J., Wu, J., Jiang, G. and Srikanthan, T., 2020. Blockchain-based public auditing for big data in cloud storage. Information Processing & Management, [online] 57(6), p.102382. Available at: https://www.sciencedirect.com/science/article/abs/pii/S0306457320308773 [Accessed: 23 December 2024].

Paper 10:

Alouffi, B., Hasnain, M., Alharbi, A., Alosaimi, W., Alyami, H. and Ayaz, M., 2021. A systematic literature review on cloud computing security: Threats and mitigation strategies. IEEE Access, [online] 9, pp.57792-57807. Available at: https://ieeexplore.ieee.org/document/9404177 [Accessed: 23 December 2024].

Paper 11:

Han, S., Han, K. and Zhang, S., 2019. A data sharing protocol to minimize security and privacy risks of cloud storage in big data era. IEEE Access, [online] 7, pp.60290-60298. Available at: https://ieeexplore.ieee.org/document/8705648 [Accessed: 23 December 2024].

Paper 12:

Tawalbeh, L.A., Saldamli, G., 2021. Reconsidering big data security and privacy in cloud and mobile cloud systems. Journal of King Saud University - Computer and Information Sciences, [online] 33(7), pp.810-819. Available at: https://www.sciencedirect.com/science/article/pii/S1319157819303337 [Accessed: 23 December 2024].

Paper 13:

Narayanan, U., Paul, V. and Joseph, S., 2022. A novel system architecture for secure authentication and data sharing in cloud enabled big data environment. Journal of King Saud University - Computer and Information Sciences, [online] 34(6, Part B), pp.3121-3135. Available at: https://www.sciencedirect.com/science/article/pii/S1319157820303700 [Accessed: 23 December 2024].

Paper 14:

Viswanath, G. and Krishna, P.V., 2021. Hybrid encryption framework for securing big data storage in multi-cloud environment. Evolutionary Intelligence, [online] 14, pp.691–698. Available at: https://link.springer.com/article/10.1007/s12065-020-00404-w [Accessed: 23 December 2024].