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# ***Introduction***

With the turn of the 21st century, the evolution of digital devices skyrocketed with breakthroughs happening in every sector of the market, from education, to banking, to government institutions and NGOs, and especially in the field of computer and data-based companies. Most of society now is reliant on technology to run its business, and make the economy move, and as such digital devices are now pivotal in the running of the economy. This is what is called Digital Transformation.

Digital transformation is the integration of digital technologies into the strategies, processes, and products of an organization in order to adapt to changing market and consumer demands (Whatfix, 2021). Both how organizations operate and how customers engage with them have undergone radical change as a result of digital transformation. Because they can now buy products and services with a single click on their phone, customers are more satisfied than before, which improved their experience with the brand tremendously, as well as increasing the company’s sales and profits. Additionally, data-based insights are now possible for organizations thanks to digital transformation, which means that companies will be able to gather and analyze data to produce insights that can be used to generate money (Thales, 2022).

However, hand in hand with this massive transformation into a digital society, we face a great environmental challenge, Climate Change. Digital technologies and climate change are unquestionably two of our civilization’s most distinguishing characteristics, and even though climate change started happening long before the switch to a digital society, and although this digital transformation is not the sole reason behind climate change, it is without a doubt having an impact on the climate situation, whether positively or negatively (UNEP, 2022).

Some of the positives of digital transformation on climate change include using less paper. Whether it was part of government bureaucracy, part of the operation for a company, or as a normal part of operation at universities, we have without a doubt seen a significant decline in the use of paper in all our institutions. This is because the digital transformation facilitates communication more easily and efficiently, it is more capable of delivering information, and getting the job done quicker than paper. As a result of the turn to using digital devices rather than paper, we have seen a decline in the use of toner ink that was required to be used when printing a paper, as it is no longer required at such high demand. This has resulted in saving energy, whether it was electricity that was required in printing a paper, or human energy that was required in printing and delivering the paper to its destination. The most direct result of using less paper is the cutting of fewer trees that were being used to make paper (ACT, 2022).

Another positive result of digital transformation is using less office space. Whether it was working from home, or having more jobs done by computers, office space is becoming less and less important due to the digital transformation. During the *Covid-19* lockdowns, working from home has become the center point of the global economy, as most businesses, learning institutions, and jobs that could work from home started working from home. Even businesses that thought it was impossible for them to work from home managed, and some even excelled at remote working. This has shown to many business owners that offices and office space is not as important as they thought it was, and as a result some have decided to cut down on using their offices. This is good for the environment because workplaces consume a lot of electricity to function, especially when it comes to controlling the office’s temperature, which significantly raises the energy cost. As less employees are working in offices, less electricity is being required to operate a smaller office space than what was being used. Furthermore, as less employees are commuting to their work, less cars are being used. These factors result in reducing the emission of greenhouse gases, whether it was in burning fossil fuels to generate electricity, or the use of petrol in running the car, which positively impacts climate change, and this was all facilitated by the digital transformation of the economy.

On the other hand, this shift can have detrimental impacts on the environment if not treated with extreme caution. Some of the negative impacts of the digital transformation include: The massive production of digital devices and the disposal of them. As digital technology is evolving at such a high pace, more and more devices are becoming outdated, and as a result they get replaced at a fast pace. The production of digital device has a direct negative impact on the environment from the extraction of raw materials to assembling them and distributing them to the end user, and after finishing the lifecycle of the device, disposing of them, especially from improper collection, recycling, and disposal. Furthermore, the operation of the digital devices has a direct negative result due to the electricity used to run the device (Truong, 2022).

Moreover, another negative result is the massive amount of data being collected. Many companies nowadays have their whole business model based upon collecting and storing data in their servers. Running these servers consumes a huge amount of electricity as these servers store a lot of data that requires more processing power, which in turn requires more energy to operate. An indirect result is that these servers emit a lot of heat which can ruin the servers and puts the data stored in them in jeopardy, which results in using a lot of cooling systems that consumes even more electricity. Furthermore, as most businesses are shifting toward cloud computing, which requires servers to operate, this problem is exacerbated even more, and some are dubbing this problem as the internet’s hidden carbon footprint. As a result of using the internet for storing data in cloud computing, the Internet would rank as the sixth-largest polluter in the world if it were a nation (Thew, 2020).

What can we do to lessen the negative effects that the digital transformation is having on the environment? One possible answer is to repurpose and use our outdated electronic devices for tasks that require less computing power than they were designed for. For instance, we could download an app like Alfred, which allows you to remotely monitor your home from your current phone or the Internet and utilize our old smartphone that we were about to toss away as an internal security camera. The tablet is another device that can be reused; due to its large screen, it can be used as a digital photo frame that holds and displays all your images. We can accomplish this by looping over the photos in an album using the Google Photos app for Android users or the Apple’s Photos app for Apple users (Velazco, 2021).

Future Technology Systems Company - FutureTEC, which is a top provider of information technology solutions located in Jordan, Kuwait, and Bahrain, requested us to prepare and oversee a new project inside their organization that explored ways to refurbish, reuse, or repair digital devices rather than replacing them in order to reduce the company’s negative environmental effect as a result of its digital transformation.

# ***Research Study***

## **The Idea of The Project**

The main goal for this project is to reduce the negative environmental impact of digital transformation, by refurbishing, repairing, and reusing digital devices rather than replacing them. Reducing the quantity of Dark and ROT Data stored in datacenters is one way to tackle this problem.

**Dark Data:** it refers to data that firms collect, process, and retain during normal business operations but rarely use for other purposes while keeping it, nevertheless. (Gartner Glossary, 2021)

ROT Data refers to Redundant, Obsolete, or Trivial Data: (Robinson, 2021)

* **Redundant:** it refers to data that has multiple duplicate copies of it kept in various locations on the same system, or possibly on a separate system altogether.
* **Obsolete:** it refers to data that is outdated or no longer in use that might have been replace by new information.
* **Trivial:** it refers to data that the company is not using and that could be easily deleted without having any negative effects on business operations.

The demand for hundreds, thousand, or even tens of thousands of servers can be greatly reduced and require much fewer servers to be able to do the same activities by lowering the amount of Dark and ROT data held in datacenters. By doing so we can significantly reduce the amount of energy that these datacenters consume whether it is for cooling the servers or running them.

The plan is to reduce the Dark and ROT data to the point where many servers will become available and no longer be needed. This can be accomplished by utilizing tools like Aparavi’s intelligent data management platform, which enables you to scan and classify all of your enterprise’s data in order to locate, relocate, or delete both Dark and ROT data from your firm (Aparavi, 2022). As a result, the servers that are no longer needed can be kept in the facility’s storage rooms for potential use in the future. When needed, we refurbish these servers using modern cutting-edge technology and repair any broken parts before bringing them back into service. After that, any e-waste created during the process of repairing and refurbishing these servers, will be recycled rather than being thrown out, thus reducing our overall amount of e-waste.

Meanwhile, the company can update its systems with new data retention guidelines. Every new piece of data that will be kept in the datacenter needs to be marked with the duration for which it will be required, such as “One Week”, “One Month”, “One Year”, “Five Years”, or “Forever”. Similar to how security cameras record video for a predetermined amount of time before deleting it, the data will be automatically deleted after that time period has passed.

**The Tools and Research Methods that were used**For this study, I made the decision to use an online survey created with Google Forms to gather the primary data on which I will base my analysis. The purpose of this survey is to measure public knowledge of how the digital transformation is affecting the environment. The Mixed-Method methodology, which combines the best components of both qualitative and quantitative methodologies to integrate viewpoints and create a rich picture, enabled me to use this tool to collect both quantitative data (using closed-ended questions) and qualitative data (using open-ended questions). While qualitative data, which focuses on words and textual data, helps in understanding people’s perspectives about specific themes, quantitative data, which focuses on numerical data and measurements, assists in assessing the relationship between two variables or in testing a set of hypotheses. Also, I decided against conducting any interviews because I was able to gather the essential information, I required by using online surveys, also, since FutureTEC is not permitted to disclose any information about their datacenters because they do not own the data that is kept there.  
To go to the online survey [click here](https://forms.gle/D28Y3p1922ZG2EpW7).

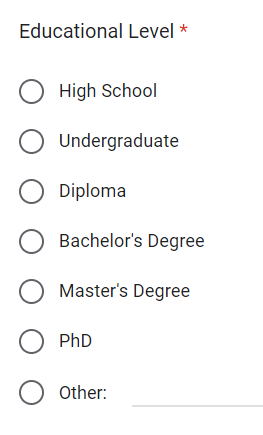
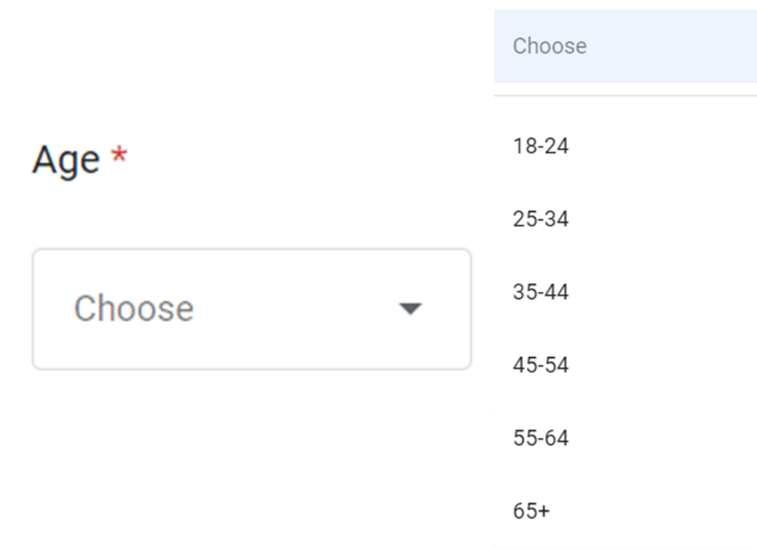
**The Sampling Method**The population of interest for this study was Jordanian IT firms with either a datacenter or firms that have their entire business on the cloud. The non-probability convenience sampling method was the method I chose to select a sample of the population. Therefore, the sample of the population for the study was FutureTEC, which is the company that had already requested that we complete the project within their own organization, along with its partners.

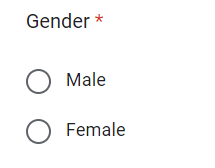
After that, I used the non-probability snowball sampling method along with the non-probability voluntary response sampling method to choose my sample for the study as it would be hard to reach the entire workforce of FutureTEC along with its partners. It was simple to get in touch with FutureTEC but difficult to get in touch with their clients, therefore I used the snowball sampling method and asked FutureTEC to send the survey to some of their partners who have their data on the “Joud Cloud” of FutureTEC. Also, the FutureTEC staff was sent the online survey through email, and as completion of the survey was not required, the voluntary response method was utilized.

**Primary Data Analysis**  
Firstly, the survey begins with a brief introduction outlining the effects of digital transformation on the environment along with some important details about the survey.



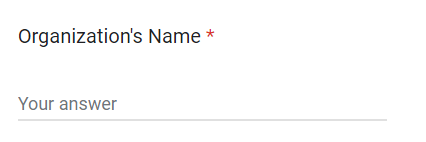
Secondly, the survey starts collecting some quantitative data by asking some general closed-ended questions about the gender, age, and educational level of the individual.





As we can see from the data above, men provided roughly two-thirds of the 11 responses (7 responses), whilst women provided one-third of them (4 responses). Regarding the age distribution, no responses were submitted by people over the age of 55, while 2 responses came from people between the ages of 18 and 24, 5 responses came from people between the ages of 25 and 34, 3 responses came from people between the ages of 35 and 44, and 1 response came from a person between the ages of 45 and 54. Concerning education levels, no responses were provided by people who listed a high school degree, a diploma, or a PhD as their highest level of education, while the majority of respondents (8 responses) appeared to hold bachelor’s degrees. In addition, 1 was an undergraduate, and 2 have a master’s degrees. None of the respondents used the “Other” option, which was intended to allow qualitative data to be submitted if a person had a degree other than those specified in the educational level enquiry.

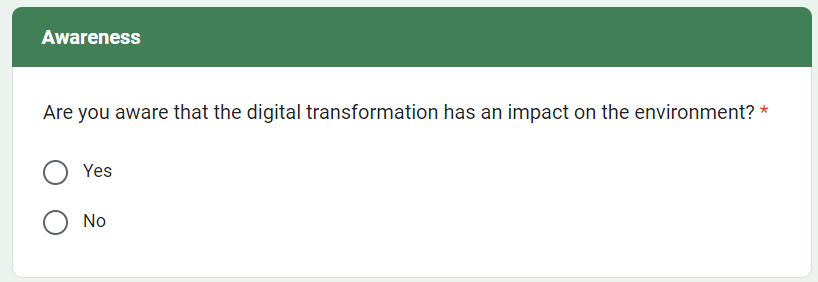
Additional general questions included ones about the name of the organization and the position in the organization, the answers to which were provided in the form of short answers (open-ended questions) rather than multiple choice responses (closed-ended questions), allowing us to gather qualitative data.

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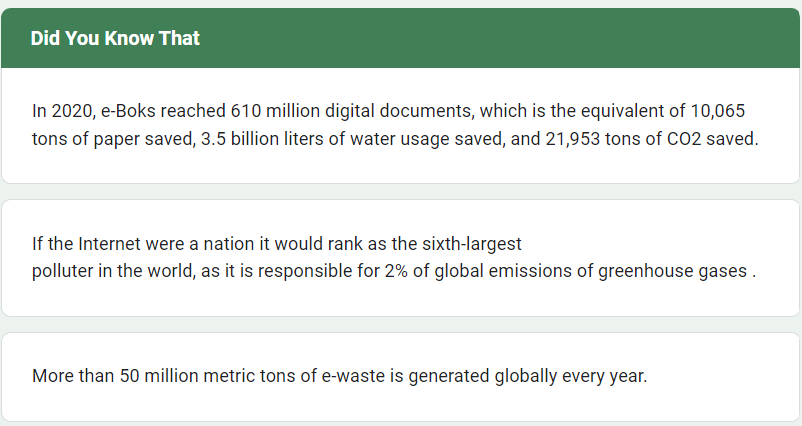
As we can see above, the majority of responses (6 responses) came from FutureTEC employees. Other responses came from some of their partners, including Microsoft (2 responses), Lenovo (1 response), Aramex (1 response), and OPTIMIZA (1 response). Since the question was optional, we were only able to gather 8 replies for the organizational position. All the positions are listed in the chart above.

In the next section, a question about whether the responder is aware of the environmental impacts of the digital transformation appears.



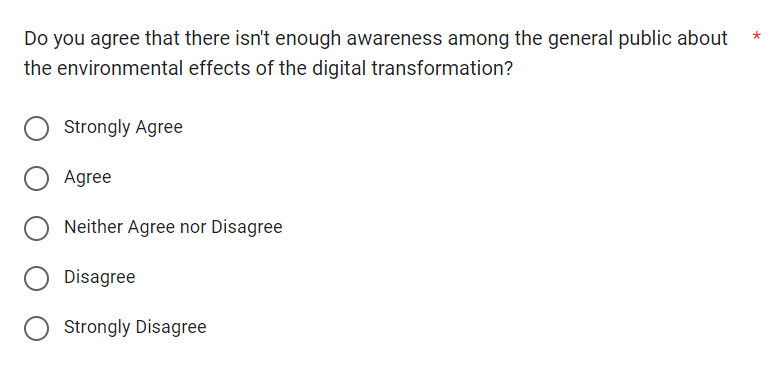
The majority of respondents (8 responses) indicated that they are aware of the environmental implications of the digital transition, while three respondents indicated that they were not. For those who replied that they were aware of the situation, they proceeded on to a new section asking for their opinions on the subject. For those who indicated they were unaware, they moved on to a new section containing some facts that would aid in their future awareness, and then they moved on to the same opinion section.

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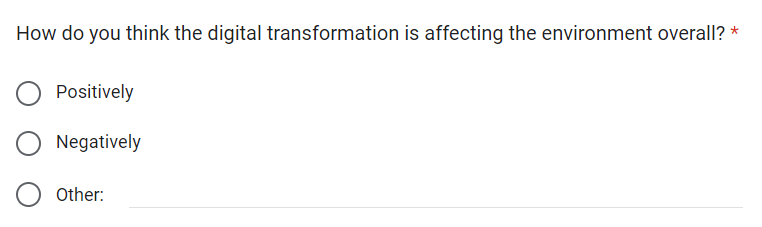
Awareness Section for thoes who answered “No”

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Description automatically generatedThe opinion section contains a total of 8 questions that mesure the level of awarness that the respondres have in regards with the environmental impact of digital transformation.

As seen above, 9 out of the respondents agreed or strongly agreed that the general public is not sufficiently aware of the environmental impact of the digital transformation, while the remaining 2 responders neither agreed nor disagreed. Ten out of the eleven respondents ranked their level of awareness as six or lower, with four choosing that ranking, one selecting five and another one selecting two, two selecting three, and two more selecting four. Out of the 11 respondents, only 1 rated their level of awareness as 8. Both questions collected quantitative data.

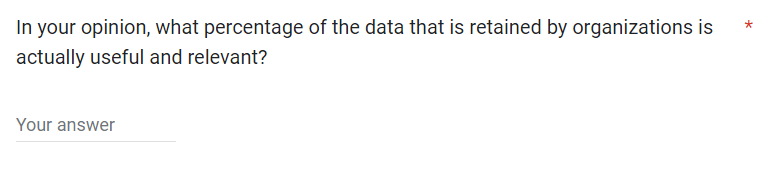
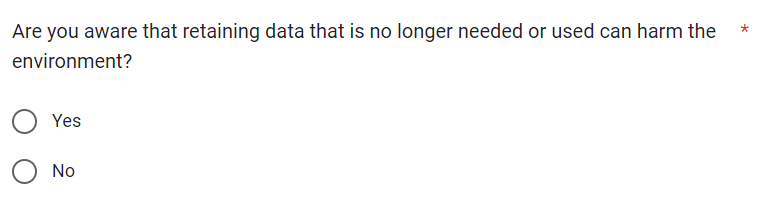
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As can be seen above, 9 out of the respondents believed that the digital transformation had an overall negative impact on the environment, with just 2 believing the opposite. None of the respondents used the “Other” option, which was intended to allow qualitative data to be submitted if a person had another opinion.

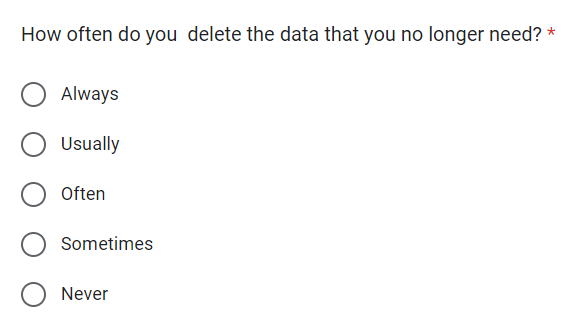
The findings from gathering, organizing, and analyzing the qualitative data obtained from responses to this question regarding both positive and negative effects, were as follows.

By far, the majority of people (6 responses) believed that the energy consumption of datacenters, electronic devices, and the Internet had a negative impact on the environment. This was followed by the production of digital devices (3 responses), the extraction of raw materials (2 responses), and e-waste (2 responses).

Regarding the positives, two respondents believed that using digital documents instead of paper would be good for the environment. This was followed by the decrease in the number of trees being cut down (1 response), working from home to reduce office electricity use (1 response), and the fact that the digital transition has opened a brand-new world for us (1 response).

It appears that 7 out of all respondents are aware that data retention has some negative impact on the environment, whereas 4 respondents are apparently unaware of this. Additionally, it seems that respondents believe that between 40% and 83% of the data that organizations store is useful, with an average of 58.6% across all respondents.

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As can be seen above, seven respondents rarely erase any unnecessary data, 3 respondents often delete this data, and only 1 respondent usually does so, while no responders always or never delete this data. Regarding the recommendations made by the respondents, two of them proposed fewer datacenters, while another two suggested recycling e-waste and another two urged raising public awareness. One respondent suggested creating energy-efficient software, another suggested enforcing new laws and regulations to stop people from hoarding data, a third suggested relying more and more on renewable energy to power our digital devices and datacenters, and a fourth suggested providing practical advice to help people lower their digital carbon footprint.

**Secondary Data Analysis**Following the collection and analysis of the primary data obtained through the online survey, we began looking for and gathering secondary data from several sources, and the results are presented below.

Only 15% of organizations’ data, according to the 2016 Global Databerg Report by Veritas Technologies, is deemed to be business crucial. As a result, 52% of all data that is processed and stored by businesses worldwide is categorized as Dark data, the value of which is unknown. The remaining 33% of the data are categorized as Redundant, Obsolete, or Trivial since they are regarded as being useless (ROT) (Veritas, 2016).

Because of a culture of “data hoarding” and disregard for retention policies, businesses are producing and storing data at record-breaking rates, leaving behind a massive carbon footprint unnecessarily. This data not only has an adverse effect on the environment, but it may also put a tremendous financial burden on these businesses, as the cost of maintaining non-critical data may cost a typical midsize company with 1000TB of data more than $650,000 a year (Veritas, 2016).

According to Aparavi, keeping ROT and Dark data can also increase the chances of security breaches. Breaches typically occur when you’re unsure of exactly what data you have or where it is. This frequently happens, especially when staff members make their own copies of documents to take home in insecure file systems or on endpoints like PCs, USB sticks, or mobile phones, only to misplace them or have their equipment stolen, which exponentially raises the danger of a data breach. Legal settlements for data breaches may cost companies a significant amount of money (Aparavi, 2022).

Following the breach of its systems, Equifax agreed to a settlement for over one billion dollars. To make it simpler for staff members to access each other’s data, some employees left a ROT data file containing all of the staff members’ passwords, on the servers, which led to this incident (Aparavi, 2022).

Simply by deleting the ROT and Dark Data stored on your servers, it might save your firm many billions of dollars while also reducing the harmful environmental effects of the digital transformation.

**Conclusions Based on the Analysis**  
After completing the analyses of the primary and secondary data using charts as a method of data visualization and Microsoft Excel as a tool, the analysis suggests that there is a significant problem with people and organization’s lack of awareness of the environmental impacts of the digital transformation, particularly with regards to the hoarding and retention of Dark and ROT data. This issue does not appear to be influenced by gender, age, organization, or position based on the primary data. Instead, it does appear that educational level does have an impact on this issue because both master’s degree holders rated their level of awareness as a 6, with an average of 6, which is higher than the overall average of 4.8.

The analysis also revealed that while most individuals are aware of some of the negative environmental effects of the digital transformation, they are not aware of its entire scale or that keeping unnecessary data after they no longer need it could put them in unnecessary financial burdens. The analysis also revealed that most people are aware of how much energy datacenters use and that this problem needs to be resolved to reduce the negative environmental effects of the digital transformation. Finally, the analysis showed that the majority of people are aware that retaining data long after they need it has negative environmental impact, but most of them rarely do anything about it, and that they don’t realize that the vast majority of data that they keep is actually useless.

## **How the Research Theme Supports the Business Requirement**

Based on the analyses of both primary and secondary data, along with all the research that was conducted to complete this project, I concluded as follows. There is a fundamental problem with how people deal with data in general. People prefer to keep their data and hoard it rather than delete it, which causes both ROT and Dark data to accumulate over time as it reaches a point that this data accounts for 85% of all data saved. This behavior also reflects how corporations handle data retention, but the difference between them and average people, who may only have a few terabytes of data, is that organizations store many terabytes, petabytes, and in some cases, even exabytes of data. Keeping that much data causes pollution and a massive carbon footprint.

FutureTEC asked us to investigate the possibility of refurbishing, repairing, and reusing digital devices rather than replacing them in order to find solutions to reduce their environmental effect as a result of their digital transition. Using the project’s initial concept, which is thoroughly explained on page5, we were able to achieve all of the aforementioned goals. The concept of reducing the environmental impact of digital transformation served as the foundation for the entire scheme. We were able to address all three points by repairing and refurbishing the servers before reuse again. In addition, we were able to recycle the leftover materials from the refurbishment rather than throwing them away as e-waste, which allowed us to meet all of the business requirements.

Although the project will cost thousands of dollars to implement and to buy the new technologies, it will ultimately save the corporation hundreds of thousands or perhaps even millions of dollars in addition to helping the environment. Additionally, by eliminating all ROT and Dark data, staff members will be able to use the organization’s system more effectively, making it simpler and safer for them to access data, improving the quality of their job, their productivity, and cutting down on their time.

# ***Organizational Study***

## **The Features of the Organization**

Future Technology Systems Company - FutureTEC is an LLC company (Limited Liability Company) (ZoomInfo, 2017). An LLC is a particular kind of Private Limited Company (LTD) in the private sector that shields its owners from being held personally liable for any financial or legal liabilities that relate to their organization (Fernando, 2022b). Providing top-notch information security, information management, and business solutions, FutureTEC is a major provider of information technology solutions and a part of the quaternary industry (FutureTEC, 2020).

**The Operational Areas of the Organization**  
Business operations are all the procedures and tools that businesses employ to generate the best products and services with maximum efficiency, to increase the value of their company, and to make a profit. Business operations differ depending on the specifics of each firm and are subject to major change depending on the status of the market or economy (CFI, 2010). Some of the business functions in FutureTEC are:

* **Human Resources (HR):** it is the department in charge of managing all activities related to the organization’s most vital resource, its employees. The HR department’s main responsibility is to hire workers who are qualified for the numerous tasks that will be expected of them, to maintain a positive workplace culture that draws and keeps skilled workers, and to ensure that workers have all they need to carry out their daily jobs. In addition to hiring and firing staff, and providing compensation and benefits, this department’s responsibilities also include increasing employee productivity and safeguarding the business from any problems that might emerge within the staff (Workable, 2021; Will Kenton, 2022). HR departments frequently make the mistake of concentrating on the financial expenses related to hiring employees, when their primary concern should be whether the candidates are a suitable fit for the jobs being filled. This is how FutureTEC hires its employees, and it is what sets their HR department apart from other HR departments.
* **Marketing:** it is the division in FutureTEC that is responsible for promoting its brand, products, and services. FutureTEC can grow and prosper to achieve their full potential and ROI with the aid of its superb marketing division. Since this division serves as the company’s public face, its primary goals are to develop and manage the company’s brand, attract new customers and investors, keep the website and social media platforms up to date, manage the company’s online presence, and carry out a range of other responsibilities. As a result, the marketing team is the group responsible for bringing in new customers, keeping existing ones satisfied, and assisting Future TEC in expanding and achieving its organizational and financial objectives (The Hartford, 2019; Indeed Editorial Team, 2021; Wrike, 2022).
* **Customer Service:** itis a service that FutureTEC provides to help its customers by making their interactions with its services as easy and enjoyable as possible, both before and after they make a purchase. FutureTEC’s customer service goes beyond merely resolving customer complaints and completing requests, like most companies do, but rather it also entails providing customers with prompt support via the channel of their choice, whether it be through the phone, email, website, or any other means of communication. FutureTEC is very selective in the people it hires for its customer service departments because they are the primary point of contact between FutureTEC and its customers, thus even if customer service only deals with customers when necessary, those interactions are crucial to keeping the organization operating properly and keeping the customers satisfied (Amsler, 2020; Salesforce, 2022).

## **How do the Features and Operational Areas of the Organization Support its Purpose?**

FutureTEC can accomplish its goals in several ways with the aid of all the features and business operations stated above. First off, by providing excellent business operations, it can assist the company in drastically raising its productivity, in turn increasing sales and revenue. Better business operations also increase customer satisfaction, and happier customers tend to spend more money on the company’s services, thus increasing their revenue even more. It also helps in creating an environment that is welcoming to growth and innovation which creates the infrastructure for innovation, thus fulfilling the organization’s purpose (Christiansen, 2021).

Additionally, having clear and specific organizational features can help customers, employees, and investors better understand the business. As a result, the business will draw in more customers, investors, and industry professionals, resulting in a highly skilled workforce, thus fulfilling the organization’s purpose as well.

By promoting this initiative and its benefits to the company’s finances and environment, the marketing and sales department may aid FutureTEC in its success. Meanwhile, the customer service department can aid FutureTEC’s clients by offering them whatever assistance they may need throughout this transition. Last but not least, the HR division can support FutureTEC’s staff members by recruiting experts to train the company’s personnel on the new system or by providing them with any assistance they require to implement this project in their business.

## **Stakeholders**

Any person or organization that is affected directly or indirectly by how a business operates or in the success or failure of the business is considered a stakeholder (Fernando, 2022a). The support of stakeholders is crucial for any project’s success since a stakeholder’s key responsibility is to provide their knowledge and perspective to a project in order to help the organization achieve its strategic goals and provide the necessary resources and supplies to them (MasterClass, 2022).

## **The Role of Internal Stakeholders**

The management, the staff, and the shareholders make up the internal stakeholders of FutureTEC. The success of the firm is of significant interest to these stakeholders because most of them have financial interests in the company due to their investments in it. Also, the internal stakeholders hold more power than external stakeholders, when it comes to decisions regarding the organization (Hill, 2019; Alva, 2021a).

* **Employees**: FutureTEC’s s ability to achieve its goals is significantly influenced by its employees, as they are the individuals who effectively contribute to the smooth operation of FutureTEC because they work diligently to produce their best work and complete the assigned tasks within the allotted time limit in order to ensure that they continue to be paid and keep their jobs (Management Study Guide, 2013; Alva, 2021a).
* **Mangers**: in addition to having a high degree of independence, high influence over their teams, and receiving a lot of support to carry out their duties, managers in FutureTEC are heavily focused on project management and how specific parts of the organization are operated (Alva, 2021a).
* **Shareholders**: since they are the company’s owners and provide financial support in exchange for earnings, shareholders are keenly interested in strong performance of the organization because it will boost their investment returns (Pearse Trust, 2018; Alva, 2021a).

## **The Role of External Stakeholders**

Since external stakeholders typically do not participate in internal operations or decision-making of FutureTEC and do not have any personal or organizational financial investments in the company, they very rarely have the power to influence the direction of the business. Their primary function, in contrast to internal stakeholders, is to invest or stop investing in the business (Compliance Prime, 2019; Hill, 2019).

* **Suppliers:** they are individuals or organizations that provide products or services to FutureTEC and depend on the company for their revenue from the sale of those commodities to generate their own income. Suppliers frequently worry about the availability and safety of their goods and services because they directly impact how your company works (Active Campaign, 2022).
* **Customers:** they are the people or businesses who utilize FutureTEC’s services, making them the major stakeholders in determining whether the business succeeds or fails. Although customers are very loyal to the businesses they deal with, they also want to use the best service available, therefore, if the company fails to live up to their expectations, customers will just take their business elsewhere (Bitesize, 2020; Alva, 2021a).
* **Government Agencies:** they are organizations that want businesses follow the law, increase employment, and adhere to sound financial practices in order to support the economy. Additionally, the government must be seen as a proxy shareholder by any organization engaged in providing services to the public (Alva, 2021a; Kimberley, 2021).
* **Communities:** the actions, goals, traditions, mindset, and policies of the community can have an impact on businesses as the company can affect the communities directly. Communities view the company as a supplier of goods and services, a source of local employment, and a buyer of local materials (Glendinning, 2016; Alva, 2021a).

## **The Impact of Internal and External Stakeholders on the Success of the Organization**

All internal and external stakeholders contribute to the success of FutureTEC, one way or the other. For example, employees contribute to the success of the company by carrying out the tasks they were hired to do with the highest levels seriousness, attention, honesty, and dedication, and by following the instructions given by their employer (Éducaloi, 2021). It should go without saying that the success of the organization will eventually result from each stakeholder being able to fulfill their responsibilities.

For instance, managers in FutureTEC contribute to the success of the company every day, by making important commercial and operational decisions in an effort to accomplish the goals and objectives set forth by shareholders and owners. At the same time, shareholders support the company’s success by deciding on FutureTEC’s operations and offer financing to help the company launch and expand, while suppliers have an impact on FutureTEC’s success by ensuring that the company receives the desired quality and quantity of goods and services on schedule. The government may help FutureTEC succeed by decreasing taxes or by allowing them enough time to adjust to any new changes in legislation. Local communities and customers can contribute to the success of FutureTEC by using its goods and services and encouraging other organization to use FutureTEC’s services (BBC Bitesize, 2020).

A company wouldn’t be able to function without its stakeholders, and stakeholders have an impact on how and why a company conducts its business. However, not all stakeholders are created equal because different stakeholder groups have different responsibilities and levels of influence over how an organization is run (Alva, 2021b).

Regardless of whether they were internal or external stakeholders, their in-depth knowledge of current procedures, background information, business insights, and their experience in the field can be very beneficial to the success of the company. It’s possible that some of them know more about the organization or the project than the project manager does. Due to their knowledge and experience, combined with increased involvement and engagement from them, they may be able to assist the business in identifying and minimizing some of its risks. Additionally, by including stakeholders early on, you can get their advice on how to gradually enhance your company, which will guarantee project approval and produce better results (Schoenhard, 2019).

**Challenges to the Success of the Organization**  
There are several challenges that FutureTEC faces regularly, some of them include:

* **Legislation and industry standards relevant to FutureTEC:** the government uses the law to control companies’ activities and stop it from exploiting individuals, protecting both customers who deals with companies and the employees who work for them. These laws have several effects on businesses, including (BBC Bitesiz, 2020):

1. **Costs and Profits**: legislations can have a significant impact on FutureTEC’s finances, and they can be a double-edged sword in that they can either boost revenues or end up costing the company thousands of dollars. Following regulations and industry standards, for instance, will improve a company’s reputation and brand image while also creating a safe and ethical workplace that will increase sales for the business drastically. On the other side, mandating that FutureTEC trains their staff, do routine safety inspections, pay taxes, and attain the minimum wage of salaries could end up costing the company thousands of dollars, driving their profits down.
2. **Marketing and Sales:** enforcing laws on FutureTEC could have a range of effects on marketing and sales. Legislations, for instance, could cause increased sales, ensure a good brand image, lower the risk of customer lawsuits, and reduce the likelihood of brand replication by other businesses. On the other hand, abiding by all rules might be expensive, which makes sales more important. Additionally, any problems with the items could have a negative effect on sales, and the branding, and intellectual property must be original.
3. **Production:** providing high-quality products and a health workplace may increase sales, boost consumer confidence, and increase employee productivity, all of which may increase the FutureTEC’s overall quality of services. This is accomplished through laws that regulate the level of quality of products and the working conditions of businesses. Enforcing these laws may be expensive because all goods and services must be produced to satisfactory standards by using high-quality materials, and productivity may be negatively impacted by complying with working-time requirements.
4. **Human Resource Act:** legislation that supports the human resource act can ensure lower staff turnover, lower hiring expenses, less complaints, and happier employees, all of which increase the FutureTEC’s productivity. However, making sure that all legal standards are followed can be costly, and if mistakes are made, costly legal action may follow.

* **Change Management:** whether they be tiny staff reorganizations or significant mergers, everyone is affected by changes, as they are necessary for any firm to succeed in a highly competitive market. It is common to experience significant resistance to these changes, but by keeping the team informed and up to date, you can greatly smooth the transition and reduce the resistance. If you don’t, it could result in decreased productivity and job satisfaction due to their lack of involvement in the change, which would result in resistance to change (Smith, 2018). There are two types of changes:

1. **Planned Changes:** it i**s** the procedure for preparing the workforce of the FutureTEC for a new direction whenever it is needed. This strategy can be used to improve the company’s culture, internal structures, procedures, measurements, rewards, and other elements (Pop, 2018). Examples of planned changes include:
2. **Expansion:** most businesses will ultimately face, and even FutureTEC faced the opportunity of business growth and development. This step is very critical for any business as it is full of opportunities and dangers, because if it is managed properly, it can raise the company’s revenue exponentially, otherwise, the results can be catastrophic to the business (Verde, 2021).
3. **Diversification:** it is a planned strategy whereby a company concentrates on multiple industries at once to offer a number of various products or services that are not necessarily related to one another in order to benefit their current customer base, a comparable market, or an altogether different audience. FutureTEC implements diversification by delivering world-class information security, information management, and business solutions. (Knowledge Center, 2019).
4. **Changes in Legislation:** most governmental law changes are outside of the control of businesses; nonetheless, these alterations must be made known to businesses before they go into effect, giving them adequate time to plan and take any necessary activities to guarantee that they abide by the new requirements. Failure to do so could have serious consequences, such as fines or jail time, as well as bad press that might have a negative effect on sales (BBC Bitesiz, 2021).
5. **System Upgrades:** when upgrading to a new system in the organization, it can come with a variety of challenges associated with the cost of the installation of the new system, the staff’s ability to adapt to the new system, and it could take some time until the organization finds a systems that is suitable to their organization, and unfortunately some data may be lost during the migration to the new system. This is one of the main challenges that FutureTEC will face when implementing the project as they need a new system to minimize data retention, and FutureTEC is planning to minimize the effect of upgrading to a new system (Merrill, 2019).
6. **Unplanned Changes:** it is changes that happen in an organization that was not anticipated before it was required, frequently as a result of changes in the environment in which it operates (Mahauganee Shaw, 2018). There are two types of unplanned change:
7. **Internal:** it is the change that occurs within a company without prior planning and is implemented hastily. Often, internal unplanned changes occur in FutureTEC, as they might arise as a result of a shift in the demographic composition of the company, such as what happens when individuals previously excluded from certain jobs are now able to perform them normally. These changes in the demographics can happen very rapidly and business have to adapt quickly to them. Another reason for unplanned internal changes could be performance gaps. For instance, when a new product or service doesn’t perform as well as anticipated, they may need to make urgent adjustments to close the gap. Performance gaps serve as catalysts for organizational innovation, according to research (Juneja, 2017).
8. **External:** organizations are forced to change as a result of two very important factors: economic uncertainty and changes in governmental rules. FutureTEC faces this problem like any other organization because this can happen when the government changes some of its legislations and it doesn’t give businesses enough time to adapt to the new regulations. Also, due to competitive constraints brought on by the global economic environment, organizations are forced to rapidly and continually change according to the market’s need to gain more clients, therefore, increase their revenue.

**Organization Requirements**  
These contain all the prerequisites that the organization must meet before the project can start.

* + **Cost:** the cost for this project mainly consists of the intelligent data management platforms that will be used to filter out all the existing data and the new system that implements new policies for data retention across the company’s entire system.
  + **Scope:** the scope of the project will be the elimination of all the ROT and Dark data across the entire system and prevent their retention.
  + **Time:** time is of the essence because holding onto ROT and Dark data costs FutureTEC hundreds of dollars daily and has a significant negative impact on the environment. However, FutureTEC shouldn’t rush the project as it should only start off after all the organization’s requirements have been satisfied. The project should be finished in about three months.
  + **Quality:** to ensure that the new system suits the organization’s requirements, this can be done by testing the system on a small part of the company’s data and checking whether it eliminated all ROT and Dark data or not, and if it removed any organizational essential data or not. If it met the organization’s needs, then the system will be of high quality.
  + **New Technologies (Resources):** as noted in the cost section, this project also needs a new data retention system to enforce regulations against hoarding data, as well as an intelligent data management platform to help filter out all the existing data.
  + **Planned Change Management:** employees should be trained on the new system prior to its installation on the entire system to ensure that the business continues its operation smoothly right after the new system has been implemented, to maximize employees’ engagement, and minimize their resistance to change.
  + **Communication:** FutureTEC should regularly and clearly communicate with its stakeholders and sponsors, in order to make sure that the system meets their expectations and is being implemented in a manner they deem appropriate.

# ***Project Recommendations and Justifications***

**Project Recommendations for Communicating with Various Stakeholders:**

Communicating effectively with stakeholders is essential for the success of this project as it is important to use methods and mediums that are appropriate for the intended audience and that can effectively convey the information needed to support the project. The communication strategy and medium are adapted to the intended audience to give them the needed information in a way that they can comprehend it. The intended audience and project research were critical in selecting the most successful ways and mediums to utilize when interacting with various stakeholders.

* **IT Department:** one of the internal technical stakeholders to consider is the IT department, as they will be responsible for implementing the new software and hardware and will require thorough technical information on the project. Written documents, such as technical specifications and user manuals, may be the most effective mode of communication for this group. Additionally, in-person or online sessions can be organized to discuss any technical concerns and provide hands-on training.
* **Vendors and Contractors:** one of the external technical stakeholders to consider is the vendors or contractors that will be in charge of repairing and refurbishing the servers. They will require thorough technical details regarding the project as well as specifics about the servers to be refurbished. Written documents, such as technical specifications and user manuals, may be the most effective medium of communication for this group. In-person or online sessions can also be conducted to discuss technical concerns and provide hands-on training.
* **Finance Department:** one of the internal non-technical stakeholders to consider is the finance department as they will be in charge of managing the project’s budget and will require financial information about the project. Written documents, such as project cost estimates and financial reports, may be the most effective medium of communication for this group as well as presentations. In-person or online meetings can also be held to discuss financial difficulties.
* **Customers:** one external non-technical stakeholder to consider is the customers of the organization as they will be interested in the benefits and value of the project, such as improved environmental sustainability and increased customer satisfaction. For this audience, written documents, such as brochures and fact sheets, may be the most effective method of communication. Additionally, presentations or online meetings can be held to discuss the project and its benefits.

The choice of method and medium of communication was heavily influenced by project research and intended audience, as project research provided us with more information on the stakeholders, their roles, and their level of technical understanding, which informed us about the type of information they require and the most effective method to convey that information. For example, if the intended audience is technical and wants thorough information on the project’s technical features, more technical documents such as technical specifications and user manuals, as well as in-person or online training sessions, would be more appropriate.

If the intended audience is non-technical, simpler and more visual materials such as brochures, presentations, and infographics would be more appropriate. Furthermore, the audience’s location and availability will be considered when picking the medium of communication; for example, if the audience is spread out, an online meeting may be more appropriate than an in-person meeting.

In summary, the communication technique and medium will be chosen depending on the intended audience’s level of technical understanding, specific information needs, availability, and location, as determined by project research. This ensures that the message is effectively transmitted and that the information presented is understood by the audience.

**Justification of Planning Decisions and Project Management Methodology:**

In the following section, we will present the arguments and justifications for the planning decisions made during the development of the project plans as we will provide detailed explanations for key points from cost estimate analysis, deliverables, success metrics, impact analysis, and the project management methodology that was selected for the project.

* 1. **Cost Estimate Analysis:**

The cost estimate analysis is an important part of the project planning process since it ensures that the project will be completed within budget. We evaluated several key factors to justify our cost estimate study:

1. We thoroughly research and identified all of the resources needed to accomplish the job, including supplies, personnel, and equipment. We were able to establish a reasonable estimate of the project’s final cost by taking the time to precisely identify all of the resources that would be required.
2. We also examined potential risks that could emerge during the project and incorporated contingencies in our cost estimate to account for them. This helped to ensure that we would have the resources we needed to deal with any unanticipated challenges that arose without jeopardizing the overall budget of the project.
3. We also considered any external factors that could have an impact on the project’s cost, such as changes in market prices or legislation. We were able to develop a cost estimate that was both accurate and adaptive to any changes that may occur by taking these external considerations into account.

In summary, our cost estimate analysis was based on thorough research, careful evaluation of potential risks and problems, and an understanding of external factors that could influence the project’s cost. We were able to develop a cost estimate that was both reasonable and adaptive to changes that may arise during the project by following these guidelines.

* 1. **Deliverables:**

A significant decision taken when designing the project plans was the selection of deliverables because these outputs are frequently used to assess project success and are normally agreed upon by project stakeholders. Our deliverables for this project comprise the following:

* 1. A new data retention system that reduces the amount of Dark and ROT data stored in data centers and requires fewer servers. This deliverable is essential to achieving the project’s goal of reducing the negative environmental impact of digital transformation, as requiring fewer servers means less energy consumed.
  2. Staff training and support to facilitate a smooth transition to the new data retention system. This deliverable is essential for increasing employee productivity and job quality.
  3. A comprehensive report on the project’s progress and outcomes, including data on the reduction of Dark and ROT data and the number of servers required. This deliverable will be used to measure the success of the project and provide key insights into the project’s impact.
  4. Proper disposal of e-waste generated during the project. This deliverable is important for ensuring that the project is not only reducing the negative environmental impact of digital transformation but also following proper e-waste disposal regulations.
  5. FutureTEC and its partners’ expenses will be reduced as a result of the new data retention guidelines system and intelligent data management platform, which will result in fewer servers and lower energy consumption costs, increasing their profitability as they save thousands or even millions of dollars by holding fewer data. This deliverable is critical for ensuring that the project not only improves the environmental impact of digital transformation but also contributes to FutureTEC’s and its partners’ financial growth and sustainability.

These deliverables were chosen after a thorough examination of the project’s aims and objectives, as well as feedback from stakeholders. They are consistent with the project’s goal of lowering the environmental effect of digital transformation, reducing the quantity of Dark and ROT data held in data centers, and requiring fewer servers while boosting employee productivity and job quality. Furthermore, they are specific, measurable, achievable, realistic, and timely which will contribute to the project’s success.

* 1. **Success Metrics:**

One of the key decisions taken when designing project plans was the selection of success metrics. These metrics were chosen to assist measure the overall performance of the project and to ensure that we can follow the progress and make any necessary adjustments along the way.

* 1. A decrease in the percentage of Dark and ROT data stored in data centers. This indicator is very relevant because it directly links to one of the project’s key goals, which is to reduce the negative environmental impact of digital transformation. We will be able to determine the extent to which we have met this goal by monitoring the amount of Dark and ROT data stored in data centers before and after the project’s execution.
  2. Data retention rules implementation, as evaluated by the percentage of data adequately tagged with retention guidelines. This measure is related to the goal of better data management and system performance. We will be able to determine the extent to which we have met this target by assessing the percentage of data that is accurately tagged with retention guidelines.
  3. Educating the team on new guidelines, as assessed by the percentage of the team that has been trained on guidelines, to increase team efficiency and data management. We will be able to measure how far we have come by measuring the percentage of the staff that has been trained on guidelines.
  4. The number of servers that have been repaired or refurbished. This metric is associated to reduce the demand for servers, as well as reducing the need to purchase new servers and extending the lifespan of current servers. We will be able to track our progress by counting the number of servers that have been repaired and refurbished.
  5. E-waste recycling, as measured by the weight of recycled e-waste, contributes to the goal of reducing environmental impact. We will be able to determine the amount to which we have met this aim by measuring the weight of recycled e-waste.
  6. The cost savings, as indicated by the total cost savings, that are related to the cost-cutting goal. We will be able to determine the extent to which we have met this target by calculating the total cost savings.
  7. Productivity growth, as measured by an increase in productivity indicators (e.g., tasks accomplished per unit of time), is related to the goal of increasing efficiency. We will be able to determine the amount to which we have reached this aim by monitoring the growth in productivity metrics.
  8. Measuring stakeholder satisfaction, as evaluated by an improvement in stakeholder satisfaction ratings and involvement in the project, is related to the goal of meeting the expectations and demands of stakeholders. We will be able to determine the amount to which we have met this aim by monitoring the increase in stakeholder satisfaction ratings.
  9. Reduce the environmental effect of digital transformation as assessed by metrics such as CO2 emissions, e-waste generated and recycled, and electricity consumed. This relates to the goal of minimizing carbon footprint and e-waste. We will be able to determine the amount to which we have reached this aim by measuring the reduction in environmental impact measurements.

Ultimately, choosing success metrics is crucial to the project’s success because it allows us to track progress and make any necessary adjustments along the way. We can ensure that we are properly assessing the impact of the project and working towards our desired outcomes by selecting metrics that are directly related to the major goals of the project.

* 1. **Impact Analysis:**

One of the important considerations taken when establishing the project plans was to undertake a detailed impact analysis. This included examining the project’s possible consequences on various stakeholders such as the company, employees, customers, and the environment. We were able to identify potential risks and build mitigation plans to limit their impact by studying the project’s potential impacts.

* 1. One of the primary justifications for this decision was the requirement to ensure that the project is in line with the organization’s sustainability goals and will have a minimal negative environmental impact.
  2. The impact analysis assisted us in identifying possible chances for the project to have a positive environmental impact, like reducing the organization’s e-waste generation.
  3. The impact analysis also assisted us in identifying potential impacts on employees, customers, and other stakeholders. We were able to build plans to minimize any bad consequences and maximize any favorable outcomes by studying these implications. This aided us in ensuring that the project will benefit all stakeholders, not just the company.

Therefore, the impact analysis was a crucial component of the planning process since it enabled us to make informed project decisions that considered the demands of all stakeholders. It aided us in ensuring that the project would be sustainable and beneficial to the environment and other stakeholders.

* 1. **Project Management Methodology:**

In terms of project development technique, we chose Agile as the project management methodology for this project after extensive analysis and research. This decision was made because Agile is well-suited for complicated projects, has significant degrees of uncertainty, or demands quick delivery. (Wrike, 2006; Atlassian, 2020; Thomas, 2022)

1. Agile allows for flexibility in the face of uncertainty. In complex projects such as this one, it is difficult to predict all of the requirements or constraints upfront therefore, the Agile methods allow the project team to adapt to changing circumstances and to incorporate feedback as the project progresses. This is especially crucial for this project, because the objectives of the project are very complicated, necessitating an approach that provides flexibility and quick delivery.
2. Agile promotes collaboration and communication because, in Agile projects, there is a focus on regular, face-to-face communication between team members and stakeholders. This can help to build trust and ensure that everyone is working towards the same goals. This is extremely critical for this project because it involves a diverse group of stakeholders, both internal and external, with a variety of technical and non-technical backgrounds.
3. Agile projects can be less expensive than typical Waterfall projects since they allow the project team to begin producing value early on, which can assist to lower overall expenses. This is critical for this project because it is focused on lowering costs, enhancing efficiency, and decreasing the negative environmental impact of digital transformation.

Lastly, the decisions made when developing project plans, such as the selection of success metrics, deliverables, and impact analysis, as well as the selection of Agile as the project management methodology, are all based on extensive research and analysis of the project objectives, the needs of stakeholders, and the potential challenges and uncertainties that may arise during the project. All of these decisions are critical to the project’s success and achievement of its goals.

**Assessing the Alignment of Project Recommendations with Organizational Needs:**

As the project manager at FutureTEC, it is critical to thoroughly examine how well the project recommendations fulfill the needs of the organization. This includes assessing how well the recommended budget, timetable, risks, resources, and change management strategy correspond with FutureTEC’s goals and objectives.

Starting with the budget, it is critical to ensure that the recommended budget is sufficient to cover all project costs. This covers the acquisition of new software and hardware, employee training, and any other necessary costs. By ensuring that the budget covers all costs, the project may be finished without the need for additional money, which can cause delays or budget overruns. It is also critical to examine the project’s possible return on investment (ROI). The project can yield savings that can help offset project expenses by lowering the environmental impact of digital transformation, reducing the amount of Dark and ROT data, and requiring fewer servers.

The project timeframe was evaluated to verify that it is reasonable and achievable. This includes determining how long each step of the project will take and ensuring that the project stays on track and schedule. A realistic and feasible timeframe helps to ensure that the project is completed on time and on budget, which is critical for sustaining stakeholder support and buy-in. Furthermore, any potential hazards or obstacles that may develop during the project must be considered, as well as how they might be managed or addressed. By recognizing and resolving potential risks, the project manager can reduce the possibility of delays or other issues, thereby ensuring the overall success of the project.

Risk management is an important component of every project, and the recommended risk management plan was examined to verify that it properly handles the project’s possible hazards. This includes recognizing potential risks, such as technical breakdowns or training delays, and developing mitigation or prevention tactics. By recognizing and resolving potential risks, the project manager can reduce the possibility of delays or other issues, thereby ensuring the overall success of the project.

The project’s resources, such as staff, equipment, and materials, were also assessed to ensure that they were sufficient to finish the job. This includes assessing the number of workers needed, as well as the sort of equipment and supplies required and how they will be procured. Delays or other challenges caused by a lack of employees, equipment, or materials can be avoided by ensuring that adequate resources are available.

Finally, the change management strategy was assessed to ensure that it successfully serves FutureTEC’s and its stakeholders’ demands. This includes conveying the project’s aims and objectives, providing training and tools to assist staff in adjusting to new systems and procedures, and giving continuing support and assistance to assure the project’s success. This can be seen in our change management plan as we first plan to raise the awareness of the staff, then prepare them to the change by making them ready, and finally making them resilient to the change, by providing them with continuous support. Resistance to the project will be reduced and it will be successfully adopted and implemented by efficiently managing the organizational change generated by the project.

FutureTEC’s recommended project plan fits the organization’s goals, as the recommended budget, timetable, risks, resources, and change management strategy are all in accordance with FutureTEC’s aims and objectives and are sufficient to assure the project’s success. The project management team will ensure that the project stays on schedule, within budget, and to the satisfaction of all stakeholders by properly analyzing and resolving the important parts of the project plan.

# ***Performance Review***

**Assessing the Accuracy and Reliability of Research Methods:**

As the project manager at FutureTEC, it is critical to assess the quality and dependability of the research methodologies employed in the project to ensure that the findings are reliable and can be utilized to make educated decisions.

There are different research approaches available, including quantitative, qualitative, and mixed-method methodologies. Quantitative research methods entail gathering and analyzing numerical data to test hypotheses and develop findings. Non-numerical data, such as words, images, and observations, are collected and analyzed using qualitative research methodologies. Mixed research methods entail studying a research problem using both quantitative and qualitative methodologies. This sort of study provides a thorough grasp of the topic under investigation and can help to address the limitations of employing only one type of research method.

The mixed-method methodology was used in this project’s research as it was chosen because it allows the researcher to obtain primary data that can be utilized to examine the problem of the negative environmental impact of digital transformation. The primary data was acquired through an online survey produced with Google Forms, which allowed us to assess public understanding of how digital transformation is impacting the environment. The poll contained both closed-ended questions that provide quantitative data and open-ended questions that provide qualitative data.

The consistency and reproducibility of the results, as well as the correspondence of the results to existing theories and other measurements of the same idea, can be used to assess the accuracy and reliability of the research methodologies used. By using the same questions and methodology for all participants, the use of an online survey as a means of data collection maintained the consistency and reproducibility of the results. Furthermore, the use of a sample size of 11 FutureTEC participants as well as some of their partners verified the results’ generalizability. The survey also has a high level of internal consistency because the questions were designed to test the same concept (awareness of the environmental impact of digital transformation) and produced consistent findings. Additionally, the survey was designed to be easy to understand and answer, which increases the internal consistency of the results.

The study’s survey has content validity since the questions were developed to measure the specific concept of interest (awareness of the environmental impact of digital transformation) and because the results were compared to established theories and other measures of the same concept.

For this study, a combination of non-probability convenience sampling and snowball sampling was used. FutureTEC, the firm that had already requested that we conduct the project within its organization, together with its partners, provided the sample for the study. This study’s sample size is 11 people, including FutureTEC workers and several partners from other companies. Although the sample size is small, it is representative of the population. The sample contains a wide range of genders, ages, organizations, professions, and educational levels. This variability in sample characteristics can improve the study’s validity and make the findings more generalizable to the population of interest.

However, the small sample size and use of non-probability sampling methods may have an impact on the study’s validity. Non-probability sampling methods, such as convenience and snowball sampling, may not give a truly representative sample of the population, resulting in biased results. Furthermore, the small sample size raises the possibility of sampling error, which might alter the precision of the results. It is important to note that a larger sample size may have been necessary if the research only relied on quantitative methods, as larger sample sizes can increase the precision of the results and make the findings more generalizable to the population.

Secondary data were acquired from a variety of sources, including Veritas Technologies’ 2016 Global Databerg Report and Aparavi’s intelligent data management platform. The secondary data used in this project is accurate and reliable as the information was gathered from credible sources such as Veritas Technologies and Aparavi, both of which are well-known data management firms. The data is also based on large-scale surveys and research, which strengthens the conclusions’ reliability and generalizability. Furthermore, the data is consistent with other research findings on the subject, which strengthens the conclusions. However, the data is from 2016, which means that it may not be completely up to date and may not reflect the current situation.

The sample characteristics, such as gender, age, organization, position, and educational level diversity, also play an important influence on the research’s accuracy and reliability. The diversity of the sample improves the study’s validity by making the findings more generalizable to the population of interest. However, it is important to note that the small sample size and use of non-probability sampling methods, such as convenience and snowball sampling, may have an impact on the study’s validity because they do not provide a truly representative sample of the population and may result in bias in the results.

In terms of reflecting on the findings of the research, it is important to consider the potential limitations of the research and how they may have affected the results. For example, the small sample size and the use of non-probability sampling methods may have limited the generalizability of the findings. Additionally, the use of an online survey as the primary method of data collection may have limited the accuracy of the results, as some participants may have provided inaccurate or false information.

Despite these limitations, the research findings indicate that there is a significant problem with people’s and organizations’ lack of awareness of the environmental impacts of digital transformation, particularly concerning the hoarding and retention of Dark and ROT data, which was very consistent with secondary data collected. Based on the primary data, this issue does not appear to be influenced by gender, age, organization, or position. Instead, educational level appears to have an impact on this issue because both master’s degree holders assessed their level of awareness as a 6, with an average of 6, which is higher than the overall average of 4.8.

The study also found that, while most people are aware of some of the negative environmental implications of digital transformation, they are not aware of the full scope of the problem, or that holding unneeded data after they no longer need it can place them in unnecessary financial debt.

Based on the research findings, it is obvious that the study provides a solid foundation for project planning suggestions and can be deemed reliable and accurate. The primary data gathered through the online survey, as well as the secondary data gathered from trusted sources, were deemed to be reliable and accurate. The data collection and analysis methods utilized were appropriate for the research aims, and steps were made to assure the data’s accuracy and reliability.

These findings have the potential to have a substantial impact on the quality of decisions and the accuracy of conclusions. The study gives important insights into the problem of data hoarding and its environmental impact, which can help to build effective solutions for decreasing the negative environmental impact of digital transformation. Furthermore, the study emphasizes the necessity of educating and raising awareness about the environmental impact of data hoarding as well as the benefits of proper data management, which can be included in the company’s operations and decision-making processes. These findings can serve to inform the development of successful strategies for decreasing the negative environmental impact of digital transformation, as well as improving the company’s operations and decision-making processes.

In conclusion, the research methodologies employed in this project, such as the mixed-method approach, online surveys, and sample methods, were chosen to be appropriate for the specified organization and project circumstances. The limited sample size and use of non-probability sampling methods, on the other hand, may have impacted the accuracy and reliability of the results. As a result, it is important to consider these limitations when interpreting the findings and making judgments based on the research, however, the data gathered can be considered accurate and reliable because it was found to be consistent with secondary data gathered from credible sources.

**Evaluating Project Planning Recommendations and Accuracy and Reliability of the Research**:

This section will assess the project planning recommendations offered following the selected organization’s needs. The evaluation will consider how well the recommended budget, timing, risks, resources, and change management strategy suit the organization’s needs. Furthermore, the accuracy and reliability of the research will be examined to ensure that the suggestions are founded on sound facts and methodology.

A complete cost estimation for the project was created, including breakdowns of expenses for project management, personnel training, software, hardware, and reserves. The total project cost was estimated to be 25,000 JOD, with an annual cost of 7,000 JOD, with a revenue estimation which was comprised of the projected income from reducing the number of servers purchased, energy saved reducing the number of servers, and cooling of the data center. The project’s expected income was 42,000 JOD annually.

In terms of ROI, the project is predicted to generate a return of 68% in the first year and 500% in the following years, implying that for every JOD invested, the company will see a return of 0.68 JOD in revenue in the first year and 5 JODs in revenue in the following years. The project is predicted to pay for itself in 7.15 months in the first year and 2 months in subsequent years, with the company profiting the rest of the year.

A cost-benefit analysis was also performed, highlighting the project’s benefits such as efficient project management, staff training, and cost savings from reducing the number of servers, energy savings, and decreased carbon footprint. The project’s costs were also evaluated, such as the cost of new software and hardware, as well as the cost of recycling e-waste. This budget recommendations were based on the research conducted which was deemed as accurate and reliable (in the previous section) and meets the needs of FutureTEC.

Secondly, the project plan was examined for its planned timeline, as it gives a full analysis of the project’s milestones and deliverables, as well as the estimated completion dates for each of them. This project’s proposed timeline is 132 days, beginning on 1/3/2023 and finishing on 31/8/2023. This timetable is practical and achievable because it includes all of the processes and milestones needed to accomplish the project. Each task in the project plan is a bit flexible for any potential delays that may develop throughout the project’s execution, ensuring that the project is completed on time and within budget. This timeline recommendations were based on the research conducted which was deemed as accurate and reliable (in the previous section) and meets the needs of FutureTEC.

The risk management strategy for the project comprises the identification of several risk types, such as technical, financial, organizational, and environmental hazards, as well as a scenario and a mitigation plan to handle the risk’s possible impact. A probability chart and an impact chart are also included in the plan, which provides a clear picture of the possibility and potential impact of each identified risk.

When analyzing the risk management strategy, it was critical to determine whether the identified risks are appropriate for the organization’s specific needs and whether the mitigation measures are adequate to address the possible impact of each risk. Furthermore, the probability and impact charts were evaluated to confirm that the likelihood and the possible impact of each risk are accurately represented, as well as that the risks have been properly prioritized.

All in all, the risk management plan looks to be detailed, since the identified risks are relevant to the project and the mitigation methods are acceptable for addressing each risk’s potential impact. The probability and impact charts help to prioritize risks by providing a clear idea of the possibility and potential impact of each risk. It is crucial to highlight, however, that no risk management plan is perfect and should be evaluated, modified, and monitored throughout the project. This risk plan recommendations were based on the research conducted which was deemed as accurate and reliable (in the previous section) and meets the needs of FutureTEC.

Moving on to the resources, it was critical to analyze whether the identified resources, including persons, equipment, and materials, are adequate for the scope of the project and sufficient to execute the project on schedule while analyzing the resource management part of the project planning guidelines. It was also critical to verify whether the resources mentioned in the plan are feasible and achievable, taking into consideration any potential delays or barriers that may develop throughout the project’s execution.

Furthermore, it is critical to assess the plan’s resource allocation and management to ensure that resources are efficiently utilized and that any possible bottlenecks or inefficiencies are discovered and resolved. The plan must also be consistent with the overarching aims and objectives of the organization.

The resource management part of the project planning guidelines is well thought out and thorough. It gives a clear overview of the project’s resources and guarantees that these resources are easily available when needed, which is critical to the project’s success. With the selected resources, the project team can finish the project efficiently and effectively on schedule. These resource management recommendations were based on the research conducted which was deemed as accurate and reliable (in the previous section) and meets the needs of FutureTEC.

As indicated in the previous section, the reliability and quality of the research data, both primary and secondary, were rigorously evaluated. The primary data acquired via the online survey was deemed to be trustworthy. The survey was created to assess public understanding of how digital transformation affects the environment, and it included both closed-ended and open-ended questions to collect both quantitative and qualitative data. Furthermore, because the survey was anonymous, participants were not swayed by social desirability bias.

Secondary data analysis was sourced from reliable sources such as Veritas Technologies and Aparavi. The data was relevant to the research objectives and was used to support the primary data analysis conclusions. The data also agreed with existing theories and other metrics of the same construct.

In conclusion, the research data, both primary and secondary, was judged to be reliable and correct. The data collection and analysis methods utilized were appropriate for the research aims, and steps were made to assure the data’s accuracy and reliability. The research findings form a solid foundation for project planning recommendations and can be deemed dependable and accurate.

# ***Project Management Plan***

1. **Scope Management Plan:** 
   * 1. **Project Requirements:**
   * **Project Functional Requirements:**

They are the requirements and tasks that a system, product, or service must be able to carry out and that are used to specify the features and capabilities of the system. Functional requirements frequently describe the input, output, and processing of the system as well as any constraints or limitations on how it can be used. Because they ensure that a system meets the needs and expectations of the users, they are essential to the design and development of a system (Altext, 2018; GeeksForGeeks, 2020). Examples of functional requirements in the project include:

1. Ability to scan and categorize all corporate data to find, move, or delete Dark and ROT data.
2. Enabling the creation of data retention policies that specify the duration for which each piece of data will be needed.
3. Enabling the refurbishment and repair of servers utilizing contemporary cutting-edge technologies and the recycling of e-waste produced during the refurbishment process.
4. Training the entire staff on how to use the new data retention guidelines and new system.
5. Erases the data on its own, when the data retention period has passed.
   * **Project Non-Functional Requirements:**

Non-functional requirements are the specifications that outline a system’s expected behavior rather than its intended function. These requirements describe the performance, security, usability, and other aspects of a system that are crucial to its proper usage and operation. Instead of being particular to the features and operations of the system, non-functional requirements are often more general and abstract (Altext, 2018; GeeksForGeeks, 2020). Examples of non-functional requirements in the project include:

1. Has high availability, to guarantee that it is always available when needed.
2. Has excellent security to guard against data breaches and illegal access.
3. Provides high performance to ensure that it can effectively manage enormous amounts of data.
4. Simple for all team members to use and comprehend.
5. Scalable to accommodate the company’s potential growth and expansion.
6. Compatible with already-in-use enterprise systems and technology to reduce disruption and integration efforts.
   * **Priority Requirements:**
7. Ability to scan and categorize all corporate data to find, move, or delete Dark and ROT data.
8. Enabling the creation of data retention policies that specify the duration for which each piece of data will be needed.
9. Enabling the refurbishment and repair of servers utilizing contemporary cutting-edge technologies and the recycling of e-waste produced during the refurbishment process.
10. Training the entire staff on how to use the new data retention guidelines and new system.
11. Erases the data on its own when the data retention period has passed.
12. Has excellent security to guard against data breaches and illegal access.
13. Providing high performance to ensure that it can effectively manage enormous amounts of data.
14. Has high availability, to guarantee that it is always available when needed.
15. Simple for all team members to use and comprehend.
16. Compatible with already-in-use enterprise systems and technology to reduce disruption and integration efforts.
17. Scalable to accommodate the company’s potential growth and expansion.
    * 1. **Scope Description:**

|  |  |
| --- | --- |
| In Scope | Out Scope |
| Reducing the environmental impact of digital transformation through refurbishment, repair, and reuse of digital devices. | Any work or activities not directly related to the refurbishment, repair, and reuse of digital devices or the reduction of Dark and ROT data. |
| Reducing the amount of Dark and ROT data stored in data centers. | Any work or activities that do not contribute to the project’s goals and objectives, such as the development of unrelated products or services. |
| Implementing new data retention guidelines and training the team on their use. | Any work or activities that exceed the allocated budget or resources for the project. |
| Recycling e-waste created during the refurbishment process. | Any work or activities that does not contribute to reducing the company’s carbon footprint and overall environmental impact. |
| Saving the company money and improving the efficiency and effectiveness of the organization’s system. | Any work or activities that violate laws, regulations, or ethical standards. |
| Improving the productivity and job satisfaction of staff members. | Any work or activities that are not approved by the project sponsor or stakeholders. |

* + 1. **Project Aim:**The project aims to address several key areas to improve the overall efficiency and sustainability of the organization. One of the main goals is to reduce the environmental impact of digital transformation through the refurbishment, repair, and reuse of digital devices. This will not only help the organization become more sustainable, but also reduce costs associated with purchasing new equipment. Another important goal is to reduce the amount of Dark and ROT data stored in data centers. This will help the organization to better manage its data and ensure that it is only storing information that is necessary for its operations. The project also aims to implement new data retention guidelines and train the team on their use. This will help the organization to better manage its data and ensure that it is only storing information that is necessary for its operations. The guidelines will also ensure that data is erased automatically when it is no longer needed, further reducing the amount of unnecessary data stored.

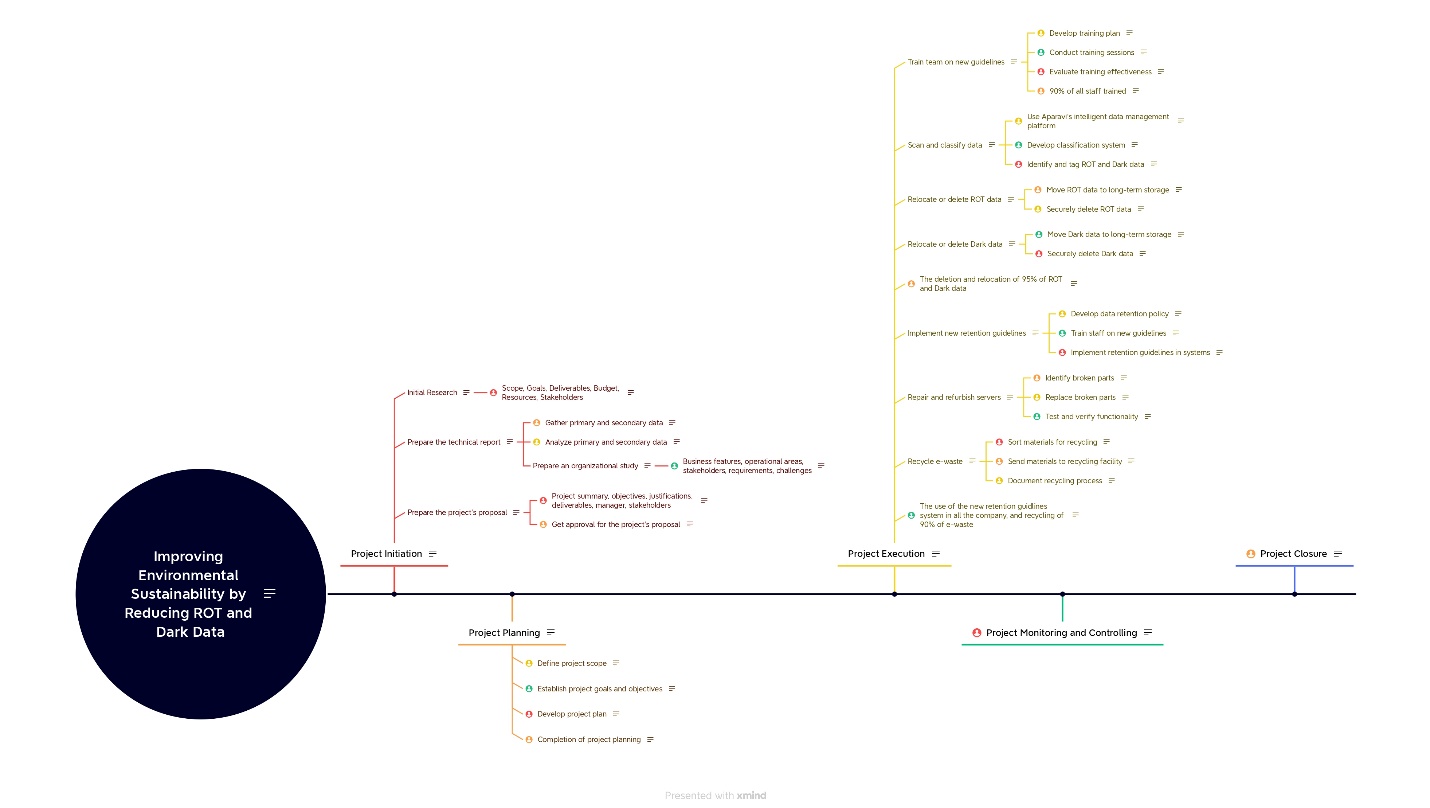
Additionally, the project aims to ensure that the system is highly available, secure, performant, user-friendly, and scalable, by a specific date. Furthermore, it aims to ensure that the system is compatible with already-in-use enterprise systems and technology to reduce disruption and integration efforts. All of these goals are specific, measurable, achievable, realistic, and have a target date for completion.

* + 1. **Project Objective:**

|  |  |  |
| --- | --- | --- |
| Project Objective | Project Benefit | Success Metric |
| Reduce Dark and ROT data | Reduce server storage needs, improve system performance, and reduce carbon footprint | Decreased percentage of Dark and ROT data |
| Implement data retention guidelines | Improve data management and improve system performance | Percentage of data appropriately labeled with retention guidelines |
| Train team on new guidelines | Improve team efficiency, improve data management | Percentage of the team trained on guidelines |
| Repair and Refurbish servers | Reduce the need to purchase new servers, expand the lifespan of servers | Number of servers repaired and refurbished |
| Recycle e-waste | Reduce environmental impact | Weight of e-waste recycled |
| Save money | Reduce costs | Total cost savings achieved |
| Improve productivity | Increase efficiency | Increase in productivity metrics (e.g. tasks completed per unit of time) |
| Improve stakeholder satisfaction | Meet stakeholder expectations and needs | Increase in stakeholder satisfaction ratings |
| Minimize the environmental impact of digital transformation | Reduce carbon footprint, reduce e-waste | Reduction in environmental impact metrics (e.g. CO2 emissions, e-waste generated, electricity consumed) |

* + 1. **Work Breakdown Structure:**

A WBS is a hierarchical breakdown of a project into more manageable, smaller parts. It is a visual tool that aids project managers in organizing and planning a project by breaking it down into smaller, more manageable tasks until the project is completely decomposed into a set of small, manageable activities. The WBS is used to plan and organize the majority of projects and aids in team alignment and progress monitoring. It also facilitates communication, aids in risk identification, and can be used as a starting point for cost, duration, and resource estimates (WBS, 2022). Below is the project’s WBS, and you can also find it in the X-mind file:



* + 1. **Milestones:**

Project milestones are significant events or achievements that signify the end of a certain phase or task within a project. They are often identified at the start of the project, and during the planning process, and are used to monitor progress and gauge the success of a project (Westland, 2021). Below are the project’s milestones:

|  |  |  |
| --- | --- | --- |
| Date | Milestone | Description |
| 22/3/2023 | Proposal Approval | Getting approval on the proposal, thus completing the initiation phase and moving on to the planning phase |
| 3/4/2023 | Project Planning | All tasks under the project planning phase have been completed and the project is ready to move on to the execution phase |
| 10/4/2023 | Staff Training | 90% of all staff members have been trained on the new data retention guidelines |
| 5/6/2023 | ROT and Dark data | Identification, and moving or deleting of 95% of ROT and Dark data has been completed |
| 31/7/2023 | Retention guidelines and e-waste | The use of the new retention guidelines system in all the company, and recycling of 90% of e-waste |

1. **Time, Cost, and Resources Management Plan:**
2. **Gantt Charts:**

A Gantt chart is a form of bar chart that is frequently used to illustrate and monitor the progress of a project and to draw attention to any delays or changes in the schedule. It is a visual representation of a project schedule that displays the beginning and ending dates of every activity as well as their interdependencies. Gantt charts offer a clear image of the project schedule and progress, which is very helpful for project managers and team members (Investopedia, 2022). The project’s Gantt Chart can be found in the file “MSCP\_MarwanAlFarah\_FinalAssignment\_ExtraImages.pdf”.

1. **Critical Path Analysis:**

A critical path analysis (CPA) is a technique used to identify a project’s critical path or the order of work that must be finished on time for the project to be finished on schedule. The project’s longest route is called the crucial path, and any delays in activities on this route will delay the project’s completion as a whole (ProjectManager, 2022a). The project’s Critical Path Analysis can be found in the file “MSCP\_MarwanAlFarah\_FinalAssignment\_ExtraImages.pdf”.

In this project, the critical path starts with the task “Initial Research” which takes 5 days and is dependent on the “Scope, Goals, Deliverables, Budget, Resources, Stakeholders” task, which also takes 5 days. Then it moves on to the next task “Prepare the technical report” which takes 8 days, and this task is dependent on the tasks “Gather primary and secondary data” which takes 5 days, “Analyze primary and secondary data” which takes 3 days and “Prepare an organizational study” which takes 3 days.

After that, it moves on to “Prepare the project’s proposal” which takes 3 days, and this task is dependent on “Project summary, objectives, justifications, deliverables, manager, stakeholders” which also takes 3 days. Then it goes to the task “Get approval for the project’s proposal” which takes no time and is dependent on the previous task.

Then, the critical path moves on to the task “Project Planning” which takes 8 days and is dependent on “Define project scope” which takes 2 days, “Establish project goals and objectives” which also takes 2 days, and “Develop project plan” which takes 6 days.

After that, it moves on to the task “Project Execution” which takes 85 days and is dependent on “Train team on new guidelines” which takes 5 days, “Scan and classify data” which takes 20 days, “Relocate or delete ROT data” which takes 10 days, “Relocate or delete Dark data” which takes 10 days, “Implement new retention guidelines” which takes 10 days, “Repair and refurbish servers” which takes 10 days, and “Recycle e-waste” which takes 10 days. Finally, the critical path ends with the task “Project Monitoring and Controlling” and “Project Closure” which takes 23 days.

As you can see, the critical path of this project is the longest path of dependent tasks from the start of the project to the end, which is “Project Initiation” to “Project Planning” to “Project Execution” to “Project Monitoring and Controlling” to “Project Closure” and taking a total of 132 days. Therefore, these tasks must be completed on time in order for the project to be completed on schedule.

The critical path and the project deadline are closely related. The critical path is the longest sequence of tasks in a project and represents the minimum amount of time required to complete the project. The project deadline is the target completion date set for the project. If any of the tasks on the critical path are delayed, the project deadline will also be delayed as the project cannot be completed until all critical path tasks are finished.

To guarantee that there will be no delay on any of the critical path tasks, we have properly planned the project’s schedule to ensure that adequate time and resources are allocated for each critical path task. We will also be monitoring and controlling the project in order to regularly track the progress of critical path tasks, identify any potential delays, and take appropriate action to resolve them. Also, by effectively communicating, we can ensure that clear communication is established between team members, stakeholders, and other relevant parties which will help to resolve any potential conflicts or issues that could cause delays. Finally, by preparing a risk management plan we can regularly assess and mitigate potential risks that could impact the critical path. By following these procedures, the likelihood of delays in critical path tasks are reduced, and the project will be completed on time.

1. **Budget:**
   * **Cost Estimation:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| WBS Items | # Units/Hrs | Costs/Unit/Hrs | Subtotals | WBS Level 1 Total | % of Total |
| 1. Project Management |  |  |  | **10,000 JOD** | **40%** |
| Project Manger | 440 | 9.5 | 4180 JOD |  |  |
| Project Team Member 1 | 184 | 7 | 1288 JOD |  |  |
| Project Team Member 2 | 416 | 7 | 2912 JOD |  |  |
| Project Team Member 3 | 216 | 7.5 | 1620 JOD |  |  |
| 1. Staff Training | 50 | 10 | 500 JOD | **500 JOD** | **2%** |
| 1. Software |  |  |  | **8500 JOD** | **34%** |
| License costs for the data management tool (Annually) | 1 | 5000 | 5000  JOD |  |  |
| Updating and implementing data retention policies and procedures | 1 | 1500 | 1500 JOD |  |  |
| Software needed for the refurbishment of servers | 1 | 2000 | 2000 JOD |  |  |
| 1. Hardware |  |  |  | **3000**  **JOD** | **12%** |
| Hardware needed for the refurbishment of servers | 1 | 2000 | 2000 JOD |  |  |
| Recycling e-waste | 1 | 1000 JOD | 1000 JOD |  |  |
| 1. Reserves | 1 | 3000 | 3000 JOD | **3000 JOD** | **12%** |
| Total Project Cost Estimate |  |  |  | **25,000 JOD** |  |

Above is the cost estimation of the project. Most of the elements above are only paid one time. In contrast, 5000 JODs will be paid annually to cover the license costs for the data management tool, along with an additional 2000 JODS for the software and hardware that is needed for the refurbishment of the servers, and the recycling of the e-waste.

* + **Revenue Estimation:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| WBS Items | # Units/Month | Revenue/Unit/Month | Totals per Month | Total Per Year | % of Total |
| Minimizing the number of servers bought | 2 | 1000 | 2000 JOD | 24000 JOD | 57.14% |
| Energy saved from minimizing the number of servers (computing power) | 1 | 1000 | 1000 JOD | 12000 JOD | 28.57% |
| Energy saved from the cooling of the data center | 1 | 500 | 500 JOD | 6000 JOD | 14.29% |
| Total Project Revenue Estimate |  |  | **3500 JOD** | **42000 JOD** |  |

* + **ROI:**

To calculate the ROI (Return on Investment), I used the following formula: ROI = Net Benefits / Cost ROI = (Revenue - Cost)/ Cost

Given the following information:

Cost of the project (First Year): 25,000 JOD

Cost of the project (Annually): 7,000 JOD Annual Revenue: 42,000 JOD

The ROI calculation for the first year would be: ROI = (42,000 - 25,000) / 25,000

ROI = 68%

The ROI calculation annually would be: ROI (42,000 - 7,000) / 7,000

ROI = 500%

This means that for every JOD invested in the project, the company will see a return of 0.68 JOD in revenue for the first year, and for every 1 JOD invested in the project, the company will see a return of 5 JODs in revenue annually. Another way to put it is the project will take 7.15 months to pay for itself in the first year, and for the rest of the year (4.85 months) the company will generate a profit, and for the remaining years the project will take 2 months to pay for itself, and the rest of the year (10 months) the company will generate a profit. In this case, the project generates a positive ROI, which means that it is generating revenue more than what it cost to implement it, and it is a financially good investment.

* + **Cost Benefit Analysis:**

The cost-benefit analysis for the project is:

Benefits:

* 1. **Project management:** 10,000 JOD, or 40% of the total project cost, is allocated for project management. The value of this cost includes ensuring the project is completed on time and within budget, minimizing risks, and maximizing gains for the organization. However, if the company chose not to invest in project management, there could be a higher risk of delays and budget overruns, as well as a lack of professional oversight and management.
  2. **Staff training:** 500 JOD, or 2% of the total project cost, is allocated for staff training. The value of this cost includes ensuring that staff is proficient in using the new software and hardware, improving their productivity, and reducing the time required for training. However, if the company chose not to invest in staff training, there could be a lack of proficiency and efficiency among staff, as well as an increase in the time and resources needed for training.
  3. **Software:** 8500 JOD, or 34% of the total project cost, is allocated for software. The value of this cost includes licenses for data management tools, updating and implementing data retention policies and procedures, and software needed for the refurbishment of servers. The software will help the organization to save time and money by reducing the number of servers required and optimizing the cooling of the data center. If the company chose not to invest in software, it would not be able to take advantage of these cost-saving and efficiency-enhancing benefits.
  4. **Hardware:** 3000 JOD, or 12% of the total project cost, is allocated for hardware. The value of this cost includes the hardware needed for the refurbishment of servers and recycling e-waste. If the company chose not to invest in hardware, it would not be able to take advantage of these cost-saving and efficiency-enhancing benefits.
  5. **Intangible benefits:** These are advantages that are difficult to measure financially. They include:
     1. Improving environmental sustainability by lowering ROT and Dark data, which reduces the need for servers and improves data center cooling.
     2. Increasing customer satisfaction by having the business invest more money in the goods or services the business offers to its clients.
     3. Increasing staff proficiency with the new software and hardware and decreasing turnover by providing training for the staff.
     4. Improving the company’s brand perception and recognition, potentially attracting more customers or providing a competitive advantage.
  6. **Revenue:** 42,000 JOD, will be provided by reducing the number of new servers needed and by reducing the amount of energy consumed due to cooling and the computational power of these servers. Due to these revenues, the project will lead to a profit of 17,000 JOD in the first year, and 35,000 annually.

Costs:

* 1. **Time:** The time required to complete the project includes the time required for project management, staff training, and implementing the software and hardware. This cost is difficult to quantify in terms of money but should be taken into account when evaluating the feasibility of the project. Without considering the time cost, the project may not be completed within the desired timeframe, leading to delays and potential loss of revenue.
  2. **Financial:**
     1. **One-time costs:** These expenses include project management, employee training, software, hardware, and reserves. They are a one-time expense incurred exclusively during project implementation (25,000 JOD for the first year). If these one-time fees are not invested in, the project may not be completed to the appropriate degree of quality, or the desired features and functionalities may be omitted.
     2. **Ongoing costs:** These expenses include the cost of data management tool licensing, as well as the hardware and software required for server refurbishment, which will be paid on a yearly basis (7,000 JOD annually). The project may not be sustained over time and may not produce long-term advantages if continuing costs are not invested in.
     3. **Long-term costs:** These costs include the future expenditures of maintaining and updating the software and hardware. If these long-term expenses are not considered, the project may not be sustainable in the long run and may not yield long-term benefits.

A cost-benefit analysis can assist evaluate whether the project is financially feasible and whether the company should pursue it by examining the project's expenses and benefits. This analysis enables clear communication with stakeholders, keeping the project on track, avoiding waste, and spending resources appropriately.

* + **Gross Profit Margin:**

The formula for Gross Profit Margin is:

Gross Profit Margin = (Revenue - Cost) / Revenue

Using the information provided in the question:

Revenue = 42,000 JOD

Cost = 25,000 JOD (first year)

Cost 7,000 JOD (annually)

Gross Profit Margin = (42,000 - 25,000) / 42,000

Gross Profit Margin = 0.4047, which can be expressed as 40.47% (first year).

Gross Profit Margin = (42,000 - 7,000) / 42,000

Gross Profit Margin = 0.8333, which can be expressed as 83.33% (annually).

* 1. **Change Management Plan:**

The stakeholders who will be affected by the change are those who will be affected by the project itself, such as employees, managers, customers, and anyone else who may be impacted by the project.

The changes that will affect these stakeholders include the introduction of new data retention guidelines and the use of tools such as Aparavi's intelligent data management platform, as well as any changes to processes, systems, or behaviors that may result from the project. Additionally, stakeholders will be impacted by the project timeline, progress updates, and training and resources that are provided to help them prepare for the changes.

* + 1. **Awareness:** (The Center for Government Innovation, 2020; Prosci, 2021)
* Communicate the project’s goal of reducing the environmental impact of digital transformation by refurbishing, repairing, and reusing digital devices, and explain the scope, timing, and benefits of the project to all stakeholders that will be affected by the change.
* Hold informational sessions or workshops to provide more detailed information about the project, including the use of tools like Aparavi’s intelligent data management platform, and new data retention guidelines, and to answer any questions or concerns that stakeholders may have.
* Regularly update stakeholders on the progress of the project, including the reduction of Dark and ROT data, and any changes to the timeline or scope of the project.
* Provide training and resources to help stakeholders understand how the project will affect them and how they can prepare for it, including the use of new tools, processes, or systems being introduced as part of the project.
  + 1. **Readiness:** (Combe, 2014; Creasy, 2017)
* Create a detailed plan outlining the steps that will be taken to implement the project, including the use of new data retention guidelines, and the implementation of the data retention system, and communicate this plan to all stakeholders.
* Offer training and resources to stakeholders to help them learn how to use new systems and guidelines that are being implemented as part of the project, such as the intelligent data management platform from Aparavi, and to help them recognize, find, and delete Dark and ROT material.
* Offer support and assistance to stakeholders as they adapt to the project, including providing one-on-one help as needed.
  + 1. **Resilience:** (Akins, 2020; Overby, 2021)
* Provide ongoing support and assistance to stakeholders as they continue to use the new system and guidelines after the project has been implemented, including assistance with the use of data retention guidelines.
* Check in with stakeholders regularly to see how they are doing, address any issues or concerns that may come up, and provide any further training or resources that are needed to assist them to continue to adapt to the project.
  + 1. **Measures of Success:** (PROSCI, 2020; Walker, 2020)
* **Feedback sessions:** Hold regular feedback sessions with stakeholders to get their input on the project and to identify any areas for improvement. This can include evaluations from employees, managers, customers, or other people who are affected by the project.
* **Adoption and Engagement:** Measure the degree to which the target audience has adopted and is using the new process, system, or behavior, through surveys, polls, and interviews to gauge their satisfaction with the project and their perception of its benefits, and tracking the usage of the new tools, processes, or systems to see how well they are being adopted by stakeholders.
* **ROI:** Measure the return on investment (ROI) of the project, including cost savings, revenue increases, or other financial metrics that are directly related to the project.
* **Performance:** Measure performance metrics that are related to the project, including productivity, quality, customer satisfaction, and other relevant measures.
  1. **Risk Management Plan:**
     1. **Risk Types:**

|  |  |  |  |
| --- | --- | --- | --- |
| Risk Type | Risk Name | Scenario | Mitigation Plan |
| Technical | R1 | Failure of refurbished servers during operation | Conduct thorough testing of refurbished servers before putting them into use and have backup servers on hand in case of failure |
| Technical | R2 | Loss of data during data migration | Back up all data before migration and have a plan in place for data recovery in case of loss |
| Technical | R3 | Delay in training due to unforeseen circumstances | Have backup trainers on hand in case of unforeseen delays and allow for flexibility in the training schedule |
| Financial | R4 | Increased cost due to unexpected expenses | Have a contingency fund in place to cover unexpected expenses and regularly review the budget to ensure it is on track |
| Financial | R5 | Decrease in funding from stakeholders | Develop a strong case for the value and benefits of the project to stakeholders and regularly communicate project progress to maintain support |
| Organizational | R6 | Resistance to change from team members | Provide training and support to team members to ease the transition to the new data retention system and encourage open communication to address any concerns |
| Organizational | R7 | Difficulty in finding skilled technicians to repair servers | Establish relationships with multiple vendors or contractors to ensure the availability of skilled technicians and consider providing in-house training to increase the pool of qualified technicians |
| Organizational | R8 | Lack of clear communication during the project | Establish clear communication channels and protocols at the beginning of the project and have regular check-ins to ensure that all team members are on the same page. |
| Environmental | R9 | Challenges in properly disposing of e-waste | Research and partner with e-waste disposal companies that follow proper disposal procedures and ensure that all e-waste is properly disposed of according to regulations. |

* + 1. **Probability Chart:**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Risk Name** | **Qualitative** | **Quantitative** |
| **Low** | R1 | Failure of refurbished servers during operation is unlikely | 2% probability based on testing server failure rates |
| R4 | Increased cost due to unexpected expenses is unlikely | 5% probability based on thorough budgeting and contingency planning |
| R6 | Resistance to change from team members is unlikely | 10% probability based on strong communication and training plan |
| **Medium** | R8 | Lack of clear communication during the project is possible | 15% probability based on a strong communication plan |
| R2 | Loss of data during data migration is possible | 20% probability based on past data migration projects |
| R5 | A decrease in funding from stakeholders is possible | 25% probability based on past experience with stakeholder funding |
| **High** | R7 | Difficulty in finding skilled technicians to repair servers is likely | 50% probability based on the availability of qualified technicians in the area |
| R9 | Challenges in properly disposing of e-waste are likely | 75% probability based on the complexity of e-waste regulations and the potential for improper disposal |
| R3 | Delay in training due to unforeseen circumstances is likely | 80% probability based on the average number of unforeseen circumstances in training projects |

* + 1. **Impact Chart:**

|  |  |  |
| --- | --- | --- |
|  | **Risk Name** | **Impact** |
| **Low** | R8 | Lack of clear communication during the project could result in misunderstandings and miscommunications among team members, leading to decreased efficiency and potential delays in the project timeline. |
| R6 | Resistance to change from team members could result in some temporary disruption to operations and decreased productivity, but the impact could be minimized through strong communication and training. |
| R4 | Increased costs due to unexpected expenses would result in a minor increase in overall project cost, but the impact would be minimal. |
| **Medium** | R1 | Failure of refurbished servers during operation would result in temporary disruption to operations and potentially some loss of productivity, but the impact would be minimal and easily recoverable. |
| R7 | Difficulty in finding skilled technicians to repair servers could result in a delay in repairs and decreased productivity, but the impact could be mitigated through the use of multiple vendors or contractors. |
| R5 | A decrease in funding from stakeholders could result in a reduction in the scope of the project or a delay in the project timeline, but the impact could be mitigated through careful management of resources. |
| **High** | R2 | Loss of data during data migration could result in significant loss of data and productivity, but the impact could be mitigated through the use of backup data and recovery plans. |
| R9 | Challenges in properly disposing of e-waste could result in legal and reputational consequences for the company, as well as potential environmental damage. |
| R3 | Delay in training due to unforeseen circumstances could result in significant disruption to operations and decreased productivity, as team members would not be properly trained on the new data retention system. |

* + 1. **Probability and Impact Matrix:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | | **Impact** | | |
| **Low** | **Medium** | **High** |
| **Probability** | **High** |  | R7 | R3 & R9 |
| **Medium** | R8 | R5 | R2 |
| **Low** | R4 & R6 | R1 |  |

* 1. **Software Development Methodology:**

Given the objectives and nature of this project, which include reducing the negative environmental impact of digital transformation, reducing the amount of Dark and ROT data stored in data centers, and requiring fewer servers while improving staff productivity and job quality, it is important to have a development methodology that allows for flexibility and rapid delivery.

The Waterfall is a software development methodology that follows a linear, sequential approach. It is well-suited for projects with well-defined requirements and a stable environment. However, there are several reasons why Waterfall may not be the best choice for this project: (Adobe, 2022; ProjectManager, 2022b)

* It is not well-suited for this project as it has a high level of uncertainty and complexity due to its nature in dealing with implementing a new data retention guideline, and classifying, then deleting or moving the data in FutureTEC’s data centers. Another reason is that in Waterfall projects, it is important to have a clear understanding of all requirements upfront, which may not be possible in projects with high complexity and uncertainty such as this one.
* It does not allow for much flexibility. Once a phase of the project is complete, it is difficult to go back and make changes. This can be a problem if requirements change or if the project team discovers that their assumptions based on the primary and secondary data that was collected and analyzed were wrong. For example, if they found out mid-project that Aparavi’s data management platform is not compatible with their system, or that it needs further configuration than what was expected.
* It can be slow and inefficient. The sequential nature of Waterfall means that it can take a long time to get to the point of delivering a working product, which can be a problem for this project as it has a tight deadline and it needs rapid delivery since each day that the Dark and ROT data is in the datacenters it causing a massive carbon footprint and costing FutureTEC hundreds of dollars.

Rapid Application Development (RAD) is a software development methodology that emphasizes rapid prototyping and rapid delivery. It is well-suited for projects with short timelines or a need for rapid delivery. However, there are several reasons why RAD may not be the best choice for this project: (Lucidchart, 2021; DevriX, 2022; KissFlow, 2022)

* The project deals with very complex requirements such as implementing a new data retention guideline, and classifying and relocating or deleting the data in FutureTEC’s data centers. The use of prototypes to gather feedback and refine the product may not be feasible with such a large number of interdependent components.
* The project has a large number of stakeholders who are responsible for implementing the new data retention policies and addressing the issue of data hoarding. This may not be practical with RAD’s approach of a small, highly-collaborative team.
* The project has long-term sustainability requirements, and RAD’s focus on delivering a working product quickly may not leave enough time for thorough testing and documentation which is crucial for the long-term success of the data retention policies.

Agile is a software development methodology that emphasizes flexibility and iteration. It is well-suited for complex projects, has high levels of uncertainty, or requires rapid delivery. Agile methods allow the project team to respond quickly to changes and to incorporate feedback from stakeholders throughout the development process. There are several reasons why Agile may be the best choice for this project: (Wrike, 2006; Atlassian, 2020; Thomas, 2022)

* Agile allows for the rapid delivery of working software. This is important for this project as it has a tight deadline and needs to get the result in FutureTEC quickly as mentioned above.
* Agile allows for flexibility in the face of uncertainty. In complex projects such as this one, it is difficult to predict all of the requirements or constraints upfront therefore, the Agile methods allow the project team to adapt to changing circumstances and to incorporate feedback as the project progresses.
* Agile promotes collaboration and communication because, in Agile projects, there is a focus on regular, face-to-face communication between team members and stakeholders. This can help to build trust and ensure that everyone is working towards the same goals.
* Agile methods can be more cost-effective because, in traditional Waterfall projects, it is not uncommon to spend a large amount of time and resources upfront on detailed planning and design. With Agile, the project team can start delivering value early on, which can help to reduce overall costs.

Overall, Agile is a well-suited methodology for this project given its focus on rapid delivery, flexibility, and collaboration.

# ***Project Proposal***

**Introduction:**

We are excited to present this proposal for a project that aims to reduce the negative environmental impact of digital transformation and improve the efficiency of data management at FutureTEC. The project aims to accomplish this by refurbishing, repairing, and reusing digital devices, reducing the amount of Dark and ROT (Redundant, Obsolete, or Trivial) data stored in datacenters, and requiring fewer servers to perform the same tasks. By implementing new data retention guidelines, we will be able to effectively scan and classify all of the company’s data, locate and delete or relocate the Dark and ROT data, and train the entire team on how to use the new system. The project will not only save the company significant costs in the long run, but it will also improve staff productivity and job quality. In this proposal, we will provide a detailed overview of the project’s objectives, scope, and expected outcomes, as well as a detailed plan on how we plan to achieve them. We look forward to the opportunity to work with FutureTEC to achieve these goals and make a positive impact on the environment.

**The Problem:**

With the rise of digital devices, datacenters have become increasingly necessary to store and manage data, but the problem with these datacenters is that they consume a significant amount of energy, leading to a high carbon footprint.

Organizations often struggle with managing and retaining data, leading to the accumulation of Dark and ROT data. Dark data is data that is maintained but only occasionally or possibly never used, while ROT data is data that is Redundant, Obsolete, or Trivial. This not only takes up valuable storage space (approximately 86% of the storage), but it also increases the energy consumption and carbon footprint of the organization.

This problem affects not only the environment but also the finances of companies. The cost of continuously replacing devices and maintaining datacenters can be significant, and the accumulation of Dark and ROT data can lead to inefficiencies and decreased productivity for staff. This can also lead to increased costs for the organization in terms of data storage and management.

In summary, digital transformation has brought about many benefits for society and organizations, but it has also created a significant environmental problem in the form of e-waste and the high carbon footprint of datacenters. Additionally, organizations struggle with managing and retaining data, leading to the accumulation of Dark and ROT data, which can negatively impact their bottom line.

**The Solution:**

The solution that we propose is to reduce the Dark (data that is maintained but only occasionally or possibly never used) and ROT data (Redundant, Obsolete, or Trivial data) to the point where many servers will become available and no longer be needed. As a result, the servers that are no longer needed can be kept in the facility’s storage rooms for potential use in the future. When needed, we refurbish these servers using modern cutting-edge technology and repair any broken parts before bringing them back into service. After that, any e-waste created during the process of repairing and refurbishing these servers will be recycled rather than thrown out, reducing our overall amount of e-waste. Reducing the amount of Dark and ROT data can be accomplished by utilizing tools like Aparavi’s intelligent data management platform, which enables you to scan and classify all of your enterprise’s data to locate, relocate, or delete both Dark and ROT data from your firm.

Meanwhile, the company can update its systems with new data retention guidelines. Every new piece of data that will be kept in the data center needs to be marked with the duration for which it will be required, such as “One Week”, “One Month”, “One Year”, “Five Years”, or “Forever”. Similar to how security cameras record video for a predetermined amount of time before deleting it, the data will be automatically deleted after that period has passed. The plan also includes training the entire team on how to utilize the new data retention guidelines system, which the business will use to run its entire operations, during this project’s execution.

**Goals and Benefits:**

The section outlines several key goals and objectives of this project to improve the overall efficiency and sustainability of the organization. The main aim of the project is to address the environmental impact of digital transformation by refurbishing, repairing, and reusing digital devices, which will not only help the organization become more sustainable but also reduce costs associated with purchasing new equipment.

Additionally, the project aims to reduce the amount of Dark and ROT data stored in data centers, implement new data retention guidelines, and train the team on their use. This will help the organization to better manage its data and ensure that it is only storing information that is necessary for its operations, while also reducing the amount of unnecessary data stored.

The project also aims to ensure that the system is highly available, secure, performant, user-friendly, and scalable by a specific date, and is compatible with already-in-use enterprise systems and technology to reduce disruption and integration efforts.

Some of the benefits of the project include reducing server and storage needs, improving system performance, reducing carbon footprint, improving data management, increasing efficiency, and meeting stakeholder expectations and needs. The success of the project will be measured by specific metrics that will be mentioned in the following section.

**Deliverables and Success Metrics:**

The project’s deliverables include a new data retention guidelines system and an intelligent data management platform that will significantly reduce the levels of Dark and ROT data in FutureTEC and its partners’ systems. This will result in fewer servers being required in the “Joud Cloud,” reducing the cloud’s energy consumption and significantly decreasing the environmental impact and carbon footprint of these businesses. Additionally, the project will result in a reduction in expenses for these corporations, increasing their profitability by saving thousands or even millions of dollars through holding fewer data.

The project will be implemented using the Pilot Changeover method, where the system will be tested on a small scale at a pilot site before being implemented throughout the entire organization and its partners. Stakeholder management will be a crucial part of the project, with FutureTEC’s complete staff receiving training on the new system and their ideas and expectations being taken into consideration. The new system will be tested on a representative sample of each type of stakeholder during the project’s execution to gather feedback and make adjustments based on their needs. Any assistance that the stakeholders may require will be provided to them after the project’s implementation.

The success of the project will be measured by several specific metrics, which will help to determine whether the project has met its goals and objectives. These metrics include:

* 1. **Reduced percentage of Dark and ROT data:** The project aims to significantly reduce the levels of Dark and ROT data in FutureTEC and its partners’ systems. The success of this goal will be measured by the percentage of Dark and ROT data that is reduced.
  2. **Percentage of data appropriately labeled with retention guidelines**: The project aims to implement new data retention guidelines to improve data management and system performance. The success of this goal will be measured by the percentage of data that is appropriately labeled with the new retention guidelines.
  3. **Percentage of the team trained on guidelines:** The project aims to train the team on the new guidelines to improve their efficiency and data management. The success of this goal will be measured by the percentage of the team that is trained on the new guidelines.
  4. **Number of servers repaired and refurbished:** The project aims to repair and refurbish servers to reduce the need to purchase new servers and extend the lifespan of the servers. The success of this goal will be measured by the number of servers that are repaired and refurbished.
  5. **Weight of e-waste recycled:** The project aims to recycle e-waste to reduce the environmental impact. The success of this goal will be measured by the weight of e-waste that is recycled.
  6. **Total cost savings achieved:** The project aims to save money by reducing costs. The success of this goal will be measured by the total cost savings achieved.
  7. **Increase in productivity metrics:** The project aims to improve productivity and increase efficiency. The success of this goal will be measured by an increase in productivity metrics, such as tasks completed per unit time.
  8. **Increase in stakeholder satisfaction ratings:** The project aims to meet stakeholder expectations and needs. The success of this goal will be measured by an increase in stakeholder satisfaction ratings.
  9. **Reduction in environmental impact metrics:** The project aims to minimize the environmental impact of digital transformation. The success of this goal will be measured by a reduction in environmental impact metrics, such as CO2 emissions, e-waste generated, and electricity consumed.

These metrics will be tracked and monitored throughout the project to ensure that the project is on track to meet its goals and objectives. If any metrics are not meeting the desired targets, adjustments can be made to the project plan to try and improve the outcome.

**Project Management Strategy:**

The project management strategy for this project will be based on the Agile methodology. Agile is a software development methodology that emphasizes flexibility and iteration. It is well-suited for projects that are complex, have high levels of uncertainty, or require rapid delivery. Agile methods allow the project team to respond quickly to changes and to incorporate feedback from stakeholders throughout the development process.

The Waterfall methodology, while well-suited for projects with well-defined requirements and a stable environment, is not the best choice for this project due to its high levels of uncertainty and complexity. The sequential nature of Waterfall can make it difficult to go back and make changes if requirements change or if assumptions based on primary and secondary data are proven to be incorrect. Additionally, the Waterfall methodology can be slow and inefficient, which can be a problem for this project with its tight deadlines and need for rapid delivery.

Rapid Application Development (RAD) methodology, while well-suited for projects with short timelines or a need for rapid delivery, may not be the best choice for this project due to its complex requirements, large number of stakeholders, and long-term sustainability requirements. The use of prototypes to gather feedback and refine the product may not be feasible with such a large number of interdependent components, and RAD’s focus on delivering a working product quickly may not leave enough time for thorough testing and documentation which is crucial for the long-term success of the data retention policies.

Agile methodology, on the other hand, allows for rapid delivery of working software, flexibility to respond quickly to changes, and the ability to incorporate feedback from stakeholders throughout the development process. This approach aligns well with the project’s objectives of reducing the negative environmental impact of digital transformation, reducing the amount of Dark and ROT data stored in data centers, and requiring fewer servers while improving staff productivity and job quality.

**Budget:**

The cost management plan for this project includes a detailed breakdown of costs associated with different elements of the project, as well as a revenue estimation and return on investment (ROI) analysis.

The cost estimation includes items such as project management, staff training, software, hardware, and reserves, with a total project cost estimate of 25,000 JOD. The revenue estimation includes items such as minimizing the number of servers bought and energy saved from minimizing the number of servers, with a total project revenue estimate of 42,000 JOD.

Given the cost of the project (first year) is 25,000 JOD, and the annual revenue is 42,000 JOD, the ROI calculation for the first year is 68%, and the ROI calculation annually is 500%. This means that for every JOD invested in the project, the company will see a return of 0.68 JOD in revenue for the first year, and for every JOD invested in the project, the company will see a return of 5 JODs in revenue annually.

The cost-benefit analysis for the project is also included, outlining the benefits and potential risks associated with different elements of the project. The project management cost, for example, is seen as a benefit as it ensures the project is completed on time and within budget, while not investing in project management could result in delays and budget overruns.

Overall, the cost management plan for this project includes a detailed breakdown of costs, revenue estimation, and ROI analysis, as well as a cost-benefit analysis to ensure the project is a financially sound investment for the organization.

**Project Requirements:**

In this project, we have identified both functional and non-functional requirements that must be met to ensure the successful implementation of our new data management system.

Our functional requirements include the ability to scan and categorize all corporate data to find, move, or delete Dark and ROT data, the ability to create data retention policies that specify the duration for which each piece of data will be needed, the ability to refurbish and repair servers utilizing contemporary cutting-edge technologies and recycle e-waste produced during the refurbishment process, and training the entire staff on how to use the new data retention guidelines and new system. Additionally, the system must be able to erase data on its own when the data retention period has passed.

Our non-functional requirements include high availability to guarantee that the system is always available when needed, excellent security to guard against data breaches and illegal access, high performance to ensure that the system can effectively manage enormous amounts of data, ease of use for all team members, scalability to accommodate the company’s potential growth and expansion, and compatibility with already-in-use enterprise systems and technology to reduce disruption and integration efforts.

In terms of priority, our functional requirements take precedence over non-functional requirements. However, all requirements are considered essential to the success of the project. The ability to scan and categorize all corporate data, enable the creation of data retention policies, and enable the refurbishment and repair of servers utilizing contemporary cutting-edge technologies and the recycling of e-waste produced during the refurbishment process is considered the top priorities. Additionally, security and performance are also considered high priorities, as they are crucial to the successful operation and use of the system.

**The Project’s Timeline:**

* 1/3/2023: Project start date
* 22/3/2023: Proposal Approval - The proposal is reviewed and approved by all relevant stakeholders, allowing the project to move forward to the planning phase.
* 3/4/2023: Project Planning - All tasks related to project planning are completed, including the development of a detailed project plan and the identification of resources needed for the project.
* 10/4/2023: Staff Training - 90% of all staff members have completed training on the new data retention guidelines, ensuring that they are prepared to effectively implement the new system.
* 5/6/2023: ROT and Dark Data Identification - Identification, and moving or deleting of 95% ROT and Dark data has been completed, reducing the amount of unnecessary data stored in the organization’s datacenters.
* 31/7/2023: Retention guidelines and e-waste - The new retention guidelines system is implemented throughout the company, and 90% of e-waste is recycled, reducing the organization’s environmental impact.
* 31/8/2023: Project end date - All project tasks are completed, and the new system is fully operational.

Regular progress reports will be provided to stakeholders throughout the project, to ensure that the project stays on track and any issues are addressed in a timely manner.

**Conclusion:**

In conclusion, the project aims to address several key areas to improve the overall efficiency and sustainability of the organization. The main goals of the project are to reduce the environmental impact of digital transformation through the refurbishment, repair, and reuse of digital devices, and to reduce the amount of Dark and ROT data stored in data centers. The project also aims to implement new data retention guidelines, train the team on their use, and ensure that the system is highly available, secure, performant, user-friendly, and scalable by a specific date. The project will be managed using an Agile methodology, and has a budget of 25,000 JOD, with an estimated ROI of 68% in the first year and 500% annually. The project’s timeline is set to start on 1/3/2023 and end on 31/8/2023. The project will comply with all relevant regulations and guidelines for data retention and e-waste disposal. The project will require a team of skilled technicians, a vendor or contractor with experience in e-waste disposal, software and tools for data migration and retention management, funding, and support from stakeholders. Overall, this project will bring significant benefits to the organization, including cost savings, improved data management, and reduced environmental impact.

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