## Smart Employee Resource Allocation and Capacity Optimization Analysis System

A Capstone Project presented to

The Faculty Committee of the College of Science

Adamson University

Manila



In Partial Fulfillment of the Requirements for

the Degree of Master in Information Technology

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# APPROVAL SHEET

In partial fulfillment of the requirements for the degree of MASTER IN INFORMATION TECHNOLOGY, this Capstone Project entitled **“Smart Employee Resource Allocation and Capacity Optimization Analysis System”**, has been prepared and submitted by **Dominique Q Adrias**.

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Approved by the committee on oral examination with the grade of **\_\_PASSED\_\_\_\_\_\_\_\_\_\_\_**.

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And last to **God** who give me knowledge, give me strength and courage for me to finish this capstone study.

# DEDICATION

The proposed project capstone is the result of various ideation and focus group discussion. The proposed project capstone is wholeheartedly and proudly dedicated to EY GDS Digital Marketing service function, campaign managers and marketing staff of EY GDS BMC team who is the beneficiary of the capstone study. I also dedicated this capstone study to my school and advisers who never stop guiding me and sharing knowledge to make this study possible I would like to also dedicate my work to my family and friends who never stop supporting me. And last, I would like to dedicate my work to God who gives me strength, courage, patience, wisdom, time, and guidance while making this capstone study.

# ABSTRACT

Digital marketing campaign managers are the right-hand men and women who provide direct support to EY’s (PPEDs) Partner, Principal, Executive Directors and Directors, managing the marketing activities and deal activations of every business engagement their PPEDs have. They plan, organize, coordinate, and control all administrative and operational procedures, activities, and documentation and responding to every information request needed on their end. This also includes tracking marketing campaigns and providing reports to EY Oceania Marketing team. Determining campaign manager’s capacity to acknowledge and provide support is an integral part of Digital Marketing workforce management. Measuring CMs utilization rate would help Account Managers on how to efficiently allocate work request received from different requestor. They also need to identify how much time spent on Billable marketing task and non GDS administrative work.

Determining team and individual utilization rate also help them to plan further growth or optimizing resources by looking at how each team and individual spent their hours. The idea of this project is to build an application that can track CMs utilization by recording all work request provided for all AMs.

The objective of this project is to lead the management do a data driven decision making by leveraging the value of data captured through the proposed system. The solution will capture and every task each CM provide on a transactional instance that will provide real time resource capacity analysis and efficient workforce allocation.

The aim of the proposed capstone project is to develop a Software that allow users to log their marketing and non-marketing daily task and visualize team and individual utilization through an interactive dashboard. This is to help the campaign managers to automate the the existing manual process of logging task in a spreadsheet. In this project, the researcher will focus on employee productivity and utilization data and transform those data into graphical representation using basic and advanced visualization tools of PBI.

The proposed capstone project it will help us also understand how important and significant data visualization in our lives especially to those organization who has a huge data. It includes how data visualization works in our system and what is the impact of having a data visualization on our system.

Keywords**:** *Data Visualization, Utilization Summary, Employee Productivity, Capacity Optimization, Resource Allocation, Task Management.*

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**Chapter 1**

**THE PROBLEM AND ITS BACKGROUND**

## Introduction

As businesses move towards digitalization, data and technology now is the talk of the decade for modern enterprise organizations both in public and private sectors. Whether a business value it or not, every business has to deal with collecting and managing massive data coming in and out of an organization. This is where technology play an important role to resolve conflict and issues related to data management. These refers to computer aided systems, software packages, internet, and other infrastructure that enables an organization's core capabilities. Forward-thinking organizations view data and technology as a competitive advantage against their competitors that allows them to move ahead and work smarter to achieve business goals.

Managing marketing activities involves various assignment purposely designed to take advantage by getting clients on board with the products and services an organization offers. Business engagement, marketing campaign, trips and meetings is where most of the activities revolves in the space of Digital Marketing. Marketing campaigns generate huge amount of transaction, customer information and preferences. These types of activities have to be managed by the workforce behind every marketing operations. Employee utilization is important for managers and marketing staff to efficiently align individual’s capacity to handle various marketing activities conducted by the partners of the firm who win and pursuit business opportunities. Back-end support is vital for business engagement to push through its goal of successfully delivering product and services to the clients. Employee’s capacity to support such task matters to deliver the requirement on time and efficiently.

## Background of the Study

Time is the limiting factor for every service business. No matter how efficient you are, you only have 24 hours in a day according to WORKAMAJIG.

Minus sick leaves, vacation time, and public holidays, most agencies get between 1489 to 1600 working hours each year. Not all of these hours are actually billable. Utilization rate is essentially a measure of how much of this available time is actually used in productive work, expressed as a percentage. Utilization rate is a way to measure the efficiency and productivity of an individual in generating revenue against available bandwidth, divided over a set period of time. In simpler terms, a utilization rate reflects the percentage of an employee’s work hours that can be billed to a client versus their overall availability. To calculate employee utilization rates correctly, it is recommended for BMC Manila to have a tool that captures the time spent by a CM for every marketing activities.

The idea of automating employee capacity to manage marketing task and produce real time utilization report came up during a quarterly ideation session with the digital marketing team. The initiative was triggered by data bot being available to their stakeholders in a weekly and monthly basis. Lack of marketing activity reports and employee utilization data brought inefficiency for managers and staff to properly allocate responsibility to existing and incoming work demand. Digital marketing team is present in all GDS location with over 60 headcounts across Manila, India, Poland and Argentina. The Manila team will be the main point of contact for this project and will be the primary beneficiary of the solution.

The researcher, as a Service Excellence SPOC for EY GDS Digital Marketing Manila propose to build a tool that would allow CMs to log and manage each task received from various requestor. This project will cover BMC efficiency goal for the next financial year. The tool aims to obtain an efficiency savings of at least 8,000-man hour savings compare to the existing manual utilization tracker they are using.

## Objectives of the Study

On the below section it shows the general and specific objectives of the propose capstone project where all the goal and objectives that must be to be achieved has been listed once the project and system has been completed.

## General Objective

The main objective of the proposed capstone project is to design and develop a Smart Employee Resource Allocation and Capacity Optimization Analysis System for EY GDS Manila Digital Marketing team. The proposed project consists of seven modules activity module, employee module, requestor module, attendance & leave module, dashboard and administration module

## Specific Objectives

The proposed project capstone aims:

1. To design and develop an activity log system for users to identify the name of the task, purpose, requestor and time taken to initialize and complete with a real time dashboard integrated and hosted Microsoft power BI service that also consist of seven modules and three access levels with different features.
   * Activity module
   * Employee module
   * Requestor module
   * Attendance & PTO module
   * Utilization Dashboard
   * PTO module
   * Administration module

**User Access Levels:**

* + Staff (Level 1)
  + Administrators (Level 2)
  + Managers (Level 3)

**Staff:**

* + Can have access to add new marketing activities
  + Can view personal utilization report
  + Can start, stop and complete active task
  + Can send individual end of day report automatically via MS outlook (optional)
  + Can create and acknowledge task from and to others.
  + Can log daily attendance and leaves.

**Admin:**

* + Can have access for all the feature of the system
  + Can view employee utilization data
  + Can disable accounts of staff and manager
  + Generate utilization reports
  + Can provision staff and manager access to the dashboard
  + Utilization historical data

**Managers:**

* + Can view staff’s utilization data such as end of day utilization
  + Can amend or edit grades to the system
  + Generate reports data visualization
  + Create task and allocate to individual and or group

1. To create a sets of questionnaire that can define if there is a significance of the current and proposed system in terms of terms of functional, sustainability, performance & efficiency, compatibility, usability, reliability, security, maintainability, and portability.

1. To define if there is a significance between the current and proposed system through comparing the answer of the responded from the prepared questionnaire that is based on the criteria of ISO/IEC 25010
2. To design and develop an administration module where the admins can have all the access in the system and have historical data and built-in analytics to visualize, understand, and work with the key data that is most important to management.

## STATEMENT OF THE PROBLEM

Specifically, the researcher seeks to answer the following questions:

1. What are the appropriate features of the software that can be developed to monitor the employee’s utilization performance using employee utilization dashboard?
2. How do the respondents assess the existing system and proposed system in terms of:

* 1. Functional sustainability
  2. Performance efficiency
  3. Compatibility
  4. Usability
  5. Reliability
  6. Maintainability
  7. Portability

1. Is there a significant difference between the existing system and proposed system?

1. How data visualization can help the employee and managers visualize, understand, and make a data driven decision for resource allocation?

## Significance of the Study

Having a standardized approach of measuring employee capacity to handle upcoming and existing work request is what this project aims to do. Eliminating data inconsistency and incorrect utilization reporting will be addressed in this topic. Managers and team leaders will have clarity on how employee workload affect employee’s productivity and work assignments. Improving business process system particularly in workforce allocation is vital to ensure quality of service delivery and stakeholder expectation. Given that organizations are adopting to remote working, employee resource allocation and capacity optimization analysis system is key to handle attrition and properly manage demand of work going on to BMC team.

The proposed capstone study shall serve to benefit the following:

**Educational Significance:**

The Significance of the conducted capstone study can contribute on employee capability enhancement towards employee career path and what are the necessary actions an organization would do to upskill people as primary resource of the businesses to generate value. With the proposed system, organization will have a standard way of managing work easily and cleverly. Employee dashboard will show how efficient staff and managers process daily task and how long would it take them to complete the job. Looking at the variances of time duration of a task will help managers consolidate necessary improvement for each employee and suggest training material, handbook and web base learning to further improve employee performance. Upskilling through trainings guarantee more SMEs (Subject matter expert of a particular task or process. Therefore, awareness and knowledge of how much time an employee spent for a task and to whom it came from make employee to smartly manage their responsibilities.

**Technological Significance:**

As business move towards digitalization, technology and data is the real deal for the organization to move ahead with their competitors. Managed service organizations invest a lot of money to people as their primary resource to operate its business. The significance of the conducted capstone project on technology is the opportunity to automate processes and leverage the value of data for decision makers. Utilizing cloud solution and technology platform to provide efficient process in capturing employee activity is what this study can provide. Innovating business way of managing people and operations will be covered in this project. On the other hand, we are also solving the problem with regards on how to sort and analyze data with the feature of the system data analyzation and visualization.

**Economical Significance:**

The significant of this conducted capstone study can help how private and government sectors like schools, company, and business to save their time and energy managing the challenges they have with their utilization data, with this capstone project we can also highlight the art of data story telling through data visualization of employee productivity, utilization, performance and demand trend. The system will stand as a decision support system to help managers and individual to efficiently optimize resource capacity by looking at the utilization reports.

## Scope and Limitation

This capstone project focuses to create a desktop software that enable user to log, start, hold, complete and share task. Furthermore, focusses on the 7 modules of the system which are the Activity, Employee, Requestor, Attendance & PTO, Dashboard and Administration of three access level the Staff, Managers, and Administrators.

The proposed capstone project was limited only to the seven modules which are the Activity, Employee, Requestor, Attendance & PTO, Dashboard and Administrator module on the system with three access level the Staff, Managers, and Administrators. The system records only the daily marketing activities of the digital marketing team and did not automatic task allocation and employee performance evaluation, salary adjustment or anything related to employee promotion and progression. It also not includes billing section of the marketing engagement section.

**Chapter 2**

**REVIEW OF RELATED LITERATURE AND THEORETICAL FRAMEWORK**

**Review of Related Literature and Studies**

## Foreign Literature

## Time and Labor Management Solution

[1] Business owners are familiar with tasks involved in tracing employees’ attendance for they need to keep track of the attendance of their employees including their check-in, check-out, and overtime hours to guarantee smooth workflows and precise payroll management. Since labor is commonly the largest operating expense of any business, it is wise to thoroughly monitor this expense. An automated time and labor management system can help every business do this efficiently because it primarily monitors an employee’s start and stop time during their work hours. Also, this system can be used by both full-time as well as hourly employees. There are different types of time and attendance systems, these are manual which uses paper cards that need to be manually time-stamped using a time stamping machine; an automated which uses RFID or radio-frequency identification based on employee ID cards or biometrics to record employee hours when they start and stop work. Lastly, an app-based which uses internet-based geolocation or facial-recognition timekeepers for clock-in and clock-out. This enable employees to clock-in and out using time clocks, mobile phones, and computers with an internet connection. This case supports the importance of tracking employee attendance and productivity using an automated process through RFID. The study is related to the research topic. (Paychex 2018)

[2] According to Toms Panders, the co-founder and CEO of Setupad, knowing where his employees are and how they are doing during working hours has always been important to him that’s why he decided to look for time tracking and employee management software. Choosing the right time tracking software is vital for any business for it provides the business with easy summaries of where your team is spending their time and it will also help the business in finding ways to guide scope discussions with clients, improve time estimation on certain types of projects, and boost overall productivity. After Toms tried several time tracking software to understand how each of this tracking software works, he was looking for a software that would punch in employee arrival and leaving times, as well as track computer using time and he found all the features he needed in DeskTime that’s why he end up choosing this time tracking software. Time tracking software also helps in building trust within the organization for it helps the owner keep a closer eye on a new team member. The software helps the business to understand if the new member fits into the hard-working culture of a company and if he/she is determined to complete the tasks given to him/her. Employee's productivity is the center of this case as it is relating to where people spend most of their time while working in the office. Capturing time arrived and time when an employee leave work is related to this project. The idea is the same to the project objective. (Toms Panders 2020)

[3] The company used a traditional, mechanical punch clock to track employees’ time which requires them to punch a paper timecard at the beginning, end of shift, and during their lunch breaks. It became a problem of the company due to the reason that breaks are getting longer and longer and the employees had a tendency to stretch out breaks to 25 minutes or 30 minutes a day instead of 20 minutes allotted. The company decided to install WaspTime time and attendance software with an RFID time clock. It is a cost-effective and integrative RFID solution for business of all sizes. This middleware program allows easy integration with existing software and enterprise systems, saving time and money. It is used to increase productivity, quality assurance and efficiency across a extensive variety of industries. WaspTime software automatically checks the time clocks and collect ‘punches’ accurately computing hours worked which can be reviewed and edited by the Afton Manufacturing’s owner. Innovation through technology can increase employee productivity and at the same time help the business track employee hours of effectively. This will strengthen the importance of having a utilization dashboard for better decision making as what this topic intend to solve. (Afton Manufacturing 2020)

[4] During pre-covid times, a medium-sized litigation firm which is based in Texas has a total number of 200 staffs which includes both lawyers and support personnel who worked in three offices located in Dallas, Houston and Austin. Individually, the office was managed by a senior partner with P&L responsibility. But, with the occurrence of the covid-19 pandemic, all the employees were assigned to work from home wherein each were given a laptop, a VPN connection, and a Voip phone for the convenience of their work. Unfortunately, because of the new normal, there were different business challenges that transpired in which one of it was that covid interrupted the “management by walking around” method which was used to manage and motivate the employees. Correspondingly, they searched for a software solution that would allow them to recover the visibility they lost with all the employees working from home. After exploring and testing several solutions, they have come up with the InterGuard which records all computer activity and then sends the data through several “Intelligence Filters” that will turn it into information. InterGuard also documents all the data in which it extracts value without having to use a thoughtful approach to organization and presentation. In addition, InterGuard turns all the data into information through its Dashboard that includes 6 views namely: Chart View (ideal for Executives), User View, Alert Log (ideal for Managers & HR), Data View, Security View (ideal for Security teams), and Reports & Notifications (ideal for everyone). Each of these view provides a variety of lens on all the recorded data that is organized for the different constituencies within the organization. The importance of tracking employee's activity remotely using employee utilization software mirror the idea of building a software intended to employee who's currently working from home. The study is related to proposed project topic. (InterGuard 2020)

[5] HasTech encounter DeskTime in April of 2020, as soon as they realized that the pandemic is going to last for a few more months and that remote work or work-from home may become the normal setting for a long time. However, it is not the first time that their employees worked remotely, because they have done it before but later decided to move to an office environment. The reason was the lack of a remote employee monitoring solution, as there were issues that the employees may be underperforming. As the company’s work focuses on project-based, the biggest concern was the time spent on finishing the projects. In reality, HasTech was struggling with deadlines. Even though, the company was overall stable, they still find ways in order for it to perform better and grow faster. Based on the company’s previous experience, the managing director of HasTech, Aslam, had to think of a management solution to lessen the burden of the remote work for the benefit of the employees and management. Fortunately, as one of Aslam’s brother works with a company that uses DeskTime, the solution was discovered quickly. Using a time tracking software was really helpful for working remotely. Time tracking has increased employees’ productivity, thus increasing the number of finished projects and the amount of monthly revenue. Ever since they start using time tracking, the company has kept an excellent performance as employees feel motivated to put their best into work. Using a time tracking software proves to be the best solution to measure employee capacity to do the work as what this study also aim to achieve. (HasTech 2020)

## Local Literature Employee Performance Management

[6] Companies need workers with exceptional skills and talents as well as extended knowledge and experiences who would commit to the company. Due to the high rates of resignations and turnover, there is a growing need for great employees, who are becoming as scarce as diamonds. Businesses lose motivated, dedicated, productive, and competitive workers who would help them achieve their objectives when turnover and resignation rates rise. Employee dedication to the company has a significant impact on its competitive edge. Because of issues with the firm or complaints, some employees frequently look for alternative businesses and positions. Employee productivity and performance are used as criteria to determine whether they are high, marginal, or bad job performers. However, despite their tireless efforts, many employees go unappreciated by their employer. They eventually leave and resign as a result, looking for new positions and businesses. Employee job performance is more influenced by compensation and benefits than by their organizational commitment. According to Herzberg's Two-Factor Theory of Motivation, it is demonstrated that benefit packages are satisfiers that can inspire employees and improve their performance and productivity. In a similar vein, HR professionals should consider employee welfare while motivating, establishing pay structures, and providing incentives. Developing a software that is able to capture employee's activity also provide insight for the leadership to have further quality check on how work is being delivered to the customers. Data captured will be beneficial for performance audit which this study also talks about. (Mary Rose Anne J. Rosalejos | Alex Adrian Y. Tacdera | Ramon Martcio 2017).

[7] The most significant asset that a business has is its human capital. Employing the right people can make or kill a company. Thus, in any type of business, it is crucial to motivate these personnel to operate effectively and efficiently. However, while the organization remains active in the sector, so do its employees. Others of its employees might leave to pursue better employment opportunities, some might retire when they reach retirement age, and some might decide to pursue self-employment. This condition might lead to the hiring of new employees who are older or younger, resulting in a generational workforce for the company. In practice, it causes generational gaps within the company. This research study can also serve as an early warning indicator for attrition by looking at employee's utilization trend. Identifying over-utilize personnel can mitigate the possibilities of an employee leaving the organization due to work overload. The study can back up this case using the data it can generate. (Roel D. Juevesa1\*, Cristina V. Juevesa2, John Michael P. Castino 2020)

[8] The inability of users to access specific online content is generally referred to as Internet censorship. The Open Net Initiative conducted research on censorship, which is frequently perceived as a state-sponsored practice along with monitoring Internet users. The political, legal, social, and cultural circumstances of Internet filtering in several countries as well as its effects on communities that rely on Internet technology for mission communication were examined using a variety of viewpoints in some studies. The part Internet Service Providers played in the filtering process, as instructed by government authorities, was crucial to this strategy. This is also done at the organizational level of the network, where offices, schools, libraries, and enterprises are all able to filter and keep an eye on Internet usage.

Specific risks, particularly in regards to security and privacy, come along with Internet access and the use of some services as they transit through intermediaries, including the workplace. In some instances, it has been demonstrated that intermediaries have been complicit in the surveillance of users, which suggests the need for control measures or guidelines that can be included in the monitoring policy and system. Decisions about the retention, filtering, monitoring, and sharing of information have significant implications for citizens around the world. (Erwin A. Alampay, Ma. Regina M. Hechanova 2017)

[9] Filipino-owned businesses are starting to see the value that human resource management can strategically contribute in their quest of organizational success in the face of today's powerfully compelling trends of globalization and fierce competition. Employee perks, pay, and performance management were all discovered to be significantly reliable determinants of organizational competitiveness. However, it was shown that the practices related to employee benefits were the main motivators among this group of human resource management techniques.

Filipino-owned businesses are placing more focus on employee perks to support their drive for competitiveness, which further suggests that employees are more motivated to succeed if flexible benefits are offered. To improve the overall ability of employee benefits to positively contribute to organizational competitiveness, businesses must continue to adopt more flexible and convenient employee benefits, especially enhancing programs that pertain to offering high package fringe benefits that can be converted to cash and to design an alluring retirement package for its employees. Furthermore, it is advised that Filipino-owned businesses start adopting the practice of feedback in performance evaluations, requiring managers to be evaluated by lower-level employees as well as the inclusion of peers in the performance evaluators, given that performance management and compensation practices are also significant predictors of organizational competitiveness though to a lesser extent. Investing to the best interest of employee can give more value to the organization. This case supports the importance of knowing how to better compensate and provide R&R program through employee productivity performance is necessary by leveraging employee performance records generated by the software proposed in this topic. (Pamela Resurreccion 2019)

[10] The Quality of Work Life is a multifaceted term with multi-dimensional constructions resulting from the researchers' and/or users' varied areas of interest. Due to the growing needs of the family structure and the current business climate, the QWL issue has reached a critical point. This led to an increase in interest in QWL across a wide range of industries and professions, not just business. The interactions between and among the worker, job content, and job context are always taken into account when determining QWL. Employee satisfaction with a certain set of variables that are pertinent and helpful to their circumstances is typically used to gauge the extent of QWL in a business. An exploratory study of the QWL domains that are common among Filipino workers within an industry and across industries may be undertaken in light of the wide variation in the conceptualization of QWL that could be attributed to the influence of the stakeholder's interests in order to produce Philippine-perspective dimensions of quality of work life. Looking at the employee utilization dashboard can help managers to promote work life balance to those that aren't utilizing the paid leaves and to employees with high utilization rate. Ensuring employee welfare and time for family is making a lot of sense. Data generated in the proposed software will help managers to make better decisions. (Maynard Riveral Bagtasos 2019)

## Foreign Studies

## STAFF ALLOCATION TO WORK STATIONS

[11] The proper organization of work is a process of identifying the work to be performed, defining responsibility and authority, and also to establish relationships for the purpose of enabling people to work most effectively together to accomplish the objectives. The interdependence of the main production factors which are labor resources, work items, and human work has a conclusive impact on the efficiency and effectiveness of the whole production system. This is mainly important when used in the production of multi-station work, where the human work and workstation must be adapted in a suitable way. (Grzelczak, 2018). According to Klimek and Łebkowski, Proper organization is vital for human work to be effective. It consists in setting the workflow so that maximum results can be obtained with the least amount of work and technical means. Poorly organized work leads to unnecessary consumption of production means and human work. The allocation of employees to workplaces is an important optimization issue, which consists in delegating employees to individual positions or tasks, in such a way that the cost of task completion is minimal or the total efficiency of all employees is maximal. The allocation should take into account the employee's characteristics, work efficiency, skills, experience, etc. The criterion for assessing such an assignment is, for example, achieving maximum personnel performance or filling all jobs taking into account the employees' qualifications and skills. Optimizing employee capacity to do the job is vital for the quality of work being delivered. This case supports the main objective of employee utilization dashboard to allocate task effectively. (Marek Krynke, Krzysztof Mielczarek, Alan Vaško 2019)

[12] Digitalization receives increased attention since the term “Industry 4.0” was introduced in the year 2011 which described as the vision of a digitalized industry. Thus, it labels the aim of a development which started already years before. Since digitalization in industry affects integrated processes, products, as well as business models, it is labeled as digital transformation. In result, manifold expectations came up simultaneously and led to very different and partially far reaching visions of the further development of production industry and their resulting future. The digitalization’s impact on industry became subject of the national and international scientific discussion. For recognizing development tendencies, obtaining further knowledge on the digitalization’s development and illustrating future expectations on selected studies on the vision of digitalized industry will be analyzed. This helps companies to benchmark their own activities, presumptions and contribution to the general scientific discourse on digitalization in industry. Furthermore, the analysis results can assist the development of measures for supporting companies within their own digital transformation. (Tim Jeske. Marlene, Würfels, Frank Lennings 2018)

[13] A thriving organization struggles to find that there is a great degree of assurance, collaboration, employee satisfaction, communication and temptation levels among its staff so that they would be more motivated towards their work responsibilities and accomplishing overall organizational objectives. According to Furnham, Eracleou, and Chamorro-Premuzic (2009), job satisfaction is described as how far the employees are satisfied with their work. This matter often happens in which two concepts are discussed together, since it is said that an individual is contented in the work-place as there is a factor and condition that motivate people. Robbins (2006) disclose that job satisfaction is a common behavior to work performance while there are awards and achievements appropriately. Also, he defined organizational commitment as a stage in which the employee recognizes a certain group with the goals, and hopes to maintain the status. Job satisfaction has a relationship with work performance. An organization with more satisfied employees or workers tends to be more effective and productive. Performance is a stage of achievement of accomplishing certain work. It means that work performance is an achievement stage as a work accomplishment by an individual from the organization. It is affected by three main factors which are the organizational support, abilities or management effectiveness, and work performance of every individual working at the organization. Employee will remain if work assigned is justifiable and satisfactory. Over utilizing people won't help them perform better which is why knowing the capacity of your workforce is important and that is where this study is trying to solve. (Anis Eliyana, Syamsul Ma’arif, Muzakki 2019)

[14] Over the last decades, research on Human Resource Management (HRM) has focused on examining the process of the effects of HR practices on employee performance. The AMO Model helps to analyze the contribution of the employees within the organization which also has been used in recent decades as a framework to guide firms in their HR practices. It suggests that there are three independent work system components that shape employee characteristics and contribute to the success of the organization. Also, the AMO theory has been adopted extensively to potentially explain the relationship between how people are managed and subsequent performance outcomes. The AMO Model has a huge contribution to the employee performance for it analyzes the variables that determines the performance of the employees. Its origin lie in the industrial psychology perspective, which proposed that performance was a function of the abilities of employees to perform. These practices may also increase employee motivation by providing them with an opportunity to develop their professional career in the field. Employee's duty and responsibility are common factors that contributes to their performance. Having aa productivity management system will help managers delegate work base on the capacity of someone to perform the job. This case is related to the topic. (Inmaculada Beltrán-Martin 2018)

[15] The experience of employees, work environment, coworkers, managers, and other variables all interact to affect performance. Employers that want to enhance their performance should perform detailed assessments that can help to uncover problems as well as solutions within the organization. Firms have realized that they have to flourish unique dynamic characteristics that empower their competitive advantages in order to survive in a constantly changing market environment. Thus, they are focusing on the exploitation of their human resources, particularly on employee performance as a source of strategic advantage. Many researchers claim that management support is an important condition for employees’ improvement. As Morrison and Phelps (1999) also indicate, when employees perceive that the management supports their job-related efforts, then it is likely that improved job performance will be noticed. Further, Parker et al. (2006) found that management support is positively related to commitment and proactivity (employee-related factors). This study will provide the management to support employee needs and address required help to ensure nothing is missing for them to perform well. That is how this study supports the topic for this research. (Anastasios D. Diamantidis, Prodromos Chatzoglou 2018)

## Local Studies Employee Treatment and Work Engagement

[16] It should be emphasized that the opinions of HR leaders and rank-and-file employees on wages and benefits as an engagement driver are different. There was some misalignment between how the HR leaders saw and how the rank-and-file employees felt about the variables that drive engagement, as seen by the HR officials' failure to acknowledge wages and benefits as an engagement driver. Therefore, it is thought essential that HR directors better grasp what motivates employees today to be engaged. It's interesting to note that millennial employees—as opposed to any of the resource speakers—were the ones who said that their wage played a significant role in determining their emotional security. It is conceivable to draw the conclusion that employees' attachment and detachment from their roles and organizations are intentional choices. As well as to draw the conclusion that pay is gradually, if not already, becoming a primary engagement driver, although HR leadership may still be in denial and holding onto the antiquated belief that pay is mostly a hygiene factor. If the job and organization don't appeal to the person or make them want to work there or be affiliated with it, there might not be engagement. Employee's attachment and detachment from work should be taken seriously. The researcher's topic will help upper management to strategize and plan accordingly base on how employee perform through the information data a software can generate.

[17] The significance of each employee's performance to the overall success of the organization has never been separated. Performance of a particular employee can be influenced by a variety of things. The top management frequently errs by assuming that pay and benefits are the direct cause of each employee's performance, and as a result, frequently concentrates on how to raise salaries and perks. Two key elements that can encourage employees to work more for the organization are salaries and benefits. According to studies, pay and perks increase workers' incentive to work, increase job satisfaction, and enhance productivity. Contrary to popular belief, financial compensation is not the only element affecting each employee's performance, as shown by numerous studies. Workplace treatment also affects productivity and engagement. The definition of treatment in the Collins dictionary is "the way how someone behaves toward others or deals with them." The term "treatment" describes how management acts or interacts with its personnel. The employee's job happiness and engagement at work might be affected by fair treatment or unjust treatment. A study on the impact of organizational justice on job satisfaction, commitment, and intention to leave was carried out by Rai (2013). According to the study, there is a connection between organizational justice and workers' job happiness, loyalty, and intention to quit. According to the report, one of the reasons an employee leaves a company is receiving unjust treatment. The study is somehow related in the area of productivity management program of an employee. ( Damianus Abun, Frelyn Badua Ranay, Theogenia Magallanes, Mary Joy, Encarnacion, Fransisco Alkalde 2020)

[18] The economic crisis which is currently afflicting businesses and nations, is acknowledged as the most difficult situation. An important factor in a country's economic development is its human resource base, especially in terms of training and development. Human capital readiness across a range of industries equips workers to adapt to change and innovation. The study looks at the effects of several training initiatives used to influence staff and improve performance and labor productivity in particular Philippine firms. Technology advancement in education is a driven truth in today's internationally demanding and challenging world. It is regarded as a need, not a choice, to carry out training in a scientific, technical manner and to achieve results that can be assessed using certain instruments. An issue facing the entire business is achieving performance results from training. It cannot be handled just through the training function. Training by itself merely works to enhance capacity. However, whether employees perform to the greatest of their abilities or at a level below their best capabilities is influenced by a complicated range of variables that are frequently and opportunistically grouped together to offer a larger pool of qualified candidates. Providing firms with effective capability-building programs will provide them a competitive edge in overcoming globalization's problems and ensuring sustainable human development. Upskilling employee and building capability enhancement will be covered in this topic by leveraging employee performance data. (Maria Jade C.Opulencia, Rommel P.Sergiob, Mervyn, J.MisajoncAlma, C.Dickson 2017)

[19] Employees must understand what they must do in order to successfully do their duties. Employee performance plans specify the expectations for employee performance. Employees are instructed on what to do by performance aspects, and how to accomplish it by standards. The efficiency of the performance appraisal process depends on creating components and standards that are clear, quantifiable, attainable, fair, and demanding. Employees should believe that performance evaluations are significant. Employees in various firms have been exposed to a range of management fads that seemed to emerge before fading away and being replaced by the next trend. Employees must be aware that management takes performance evaluation and enhancement seriously. An efficient performance management system relies on daily management of employees' performance. It must possess and comprehend a complete and current job description for the position in order to work effectively. A strong performance management program must include accurate and timely feedback regarding employee performance on aspects and standards. The study can relate to some of the points this research is trying to address. (Gina D. Galvez, PhD 2019)

[20] Employee relations describe the interactions between an employer and their staff members, including their managers, subordinates, and coworkers. Each team member is different from the others in terms of personality, strengths, weaknesses, and limitations, but despite these differences, they all share a same goal which is the success of the business. One organization might stand out from others by having strong teamwork. The company's future direction and whether employee relations are healthy, productive, or could have a negative impact on the business are both determined by this distinctiveness. It is well recognized that when there is a good working connection, the employees are more efficient, loyal, and productive.

Employees feel more valuable and committed to their jobs when they are recognized as essential components of the company's purpose. It's probably doing a good job of influencing how the organization develops in the future. Employers should look after their staff members so that they will look after their jobs. They will be inspired to give their all to deliver high-quality services because they enjoy what they do and want to do well for both the business and the customers. Employees constantly want to feel like they are contributing to the company's goals, which call for continuous learning, improved communication, and equitable benefits. A corporation that has strong working relationships among its employees can produce high-quality work. The study can relate to what this article covered. (Charlene Ivy M. Bacong, Hadge A. Encio 2017)

## Conceptual Framework (IPO)

Task Management System

•

•

**INPUT**

Users

•

Marketing Staff

•

Managers

•

Administrator

Data

•

Activity ID

•

Employee name

•

Activity

•

Time spent

Hardware & Software

•

Desktop

•

Mobile Phone

**PROCESS**

•

Activity logging

•

Attendance & Leaves

•

Task management

•

Task amendments

•

Utilization Analysis

Report generation

**OUTPUT**

•

View started and completed task

•

Produce employee utilization report

•

View activity list

•

Users Profile

•

View over -tilized and under-utilized staffs

**Figure 1. Conceptual Framework**

Conceptual Framework (IPO)

The above IPO model summarized the Input, Process and Output of the system. The Input contains all the three main users of the system which are the Administrator, Managers and Staff access, that three-access level is the main core of the system and those users are the one who mostly will interact and use the system. It also includes the data that will be entered and process to the system and the two hardware devices that will be used by all the users. On the process, it contains the main function and process of the system for all the data that has been entered and for the output it shows all the output that will be given by the system from all the data’s that has been generated through the process of the system.

## System Architecture

## Figure 2. System Architecture

The project's system architecture is depicted in the diagram below, which depicts the conceptual model that defines the system's structure, behavior, and flow. On the first level of the system, we have three types of users: Staff, Managers, and Administrator. These users are the one who entering and requesting data from a software installed in computer desktop. Logging, managing and amending task details can be accessed in this device with following its process and features. Through the devices the application will request data from the cloud MSSQL Azure database, which will be returned to the device and giving an output to the users. Same will happen in the Dashboard side, real time utilization data will automatically feed data to the dashboard to produce employee utilization report.

## Operational Definition of Terms

The below section contains all the terms and abbreviations used in the capstone studies. This section will help us to understand and give us more insight into all the terms used in the documents.

**Dashboard**– is a collection of employee utilization report house in Microsoft power BI that uses advance and interactive visualization tools. This will be integrated to the system as part of the data analysis feature.

**Employee utilization** - Utilization is defined as the amount of an employee's available time that's used for productive, billable work, expressed as a percentage. An employee's utilization rate is a critical metric for organizations to track employee capacity to do the job.

**MSSQL Azure Cloud** - Azure SQL Database is a fully managed platform as a service (PaaS) database engine that handles most of the database management functions such as upgrading, patching, backups, and monitoring without user involvement. Azure SQL Database is always running on the latest stable version of the SQL Server database engine and patched OS with 99.99% availability. PaaS capabilities built into Azure SQL Database enable you to focus on the domain-specific database administration and optimization activities that are critical for your business.

**Chapter 3**

## METHODS AND PROCEDURES

The respondent of the proposed project capstone study consists of three category which are the Staff, Managers and Task Administrators most of them are Digital marketing and certified professionals that has experienced enough to understand the researcher proposed study. From the population size of 60 staffs and 8 Managers as of November 2022, a sample size with sufficient number of participants to adequately address the research question that can be used to estimate the sample size needed to produce a confidence interval estimate with a specified margin of error (precision) or to ensure that a test has a high probability of detecting a meaningful difference in the parameter, yielding response rates of 40% from the staffs and 60% among in the managers.

The researcher will employ a standardized questionnaire for ISO using the Software

Product Quality standards commonly known as ISO/IEC 25010. ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. This system quality model defined in ISO/IEC 25010 comprises the eight quality characteristics this are Functional

Suitability, Performance Efficiency, Compatibility, Usability, Reliability, Security, Maintainability and Portability to provide a current situation in identifying its critical success

This is where the researcher will compile their findings and synthesize them in order to determine the core problems and issue that respondents have identified up to this point. The researcher chooses to use both qualitative and quantitative research, because variables like utilization hours, number of task and requestors are defined and identified, and then relevant data is collected from study participants. The strength of this type of research is that the data is in numeric form, making it easier to examine. In additional, Data can be incredibly constant, precise, and reliable. With the help of Likert scale, we can identify the grades given by the respondents on the current state of the system and the proposed system.

The Likert scale will be use and it will be responded as follows:

|  |  |
| --- | --- |
| **Scale** | **Description** |
| 4.21 – 5.00  3.41 – 4.20  2.61 – 3.40  1.81 – 2.60  1.00 – 1.80 | Acceptable  Slightly acceptable  Undecided  Slightly undecided  Unacceptable |

**Table 1. Likert Scale**

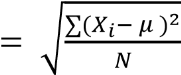
## Data Gathering Procedure

The proposed capstone project research will be conducted out and distributed through a survey system, with the respondents filling out MS forms and sent it via email to the respondents. Additionally, the researcher performed a one-hour online interview with four individuals: The Task Administrator of the DM team, two managers, and one staff. This entails consulting specialists to learn more about the area of concern by observing, interacting, and empathizing with these people to learn about their experiences with the existing available solution and to obtain a more intimate grasp of the issues involved. The researcher recognizes that there is still room for improvement in the procedure, and that limited features will have an impact on the research study's implementation.

## Statistical Data Analysis and Procedure

The information gathered will be analyzed both descriptively and inferentially. In addition, the number of responders in each part will be determined using frequency distribution and percentage. Descriptive statistics are crucial because it would be difficult to visualize what the data was indicating if we just presented it as raw data, especially if there was a lot of it. As a result, descriptive statistics helps us to present data in a more meaningful fashion, making data interpretation easier. The researcher will utilize this statistics method to evaluate if the data is normal during the examination. In this research study, descriptive statistics will be utilized to characterize the essential aspects of the data. It has the ability to produce basic summaries of the sample and measures Together with simple graphics analysis, they form the basis of virtually every quantitative analysis of data.

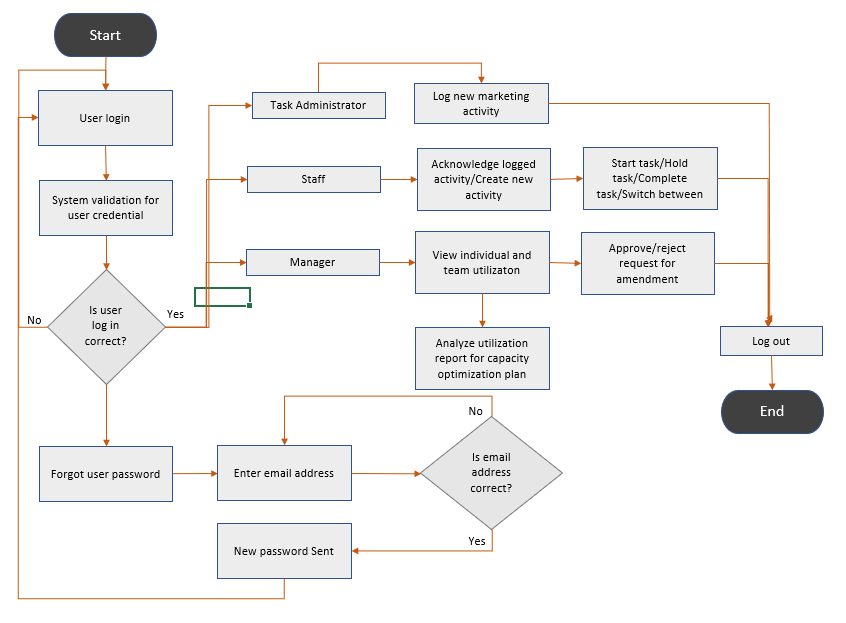
In addition, the researcher will utilize the t-test as a statistical tool to see if there is a significant difference between the current system and the planned capstone study implementation. The T-Test is used to see if a technique has an effect on both samples and if the groups are different from one another. It allows the mean of two systems to be compared. We can determine and identify whether the implemented system is approved or rejected by the respondents and beneficiaries based on the comparison. We can identify if there is a significant difference between the current system and the proposed system by using comparative analysis comparing the results of the questionnaire prepared by the proponents to be answered by different respondents such as IT experts, Task Administrators, managers, and marketing staffs. With the given statistical method based on the grade given by the respondent we were able to answer the statement of the problem #3 if there is a significance between the current system and the proposed system. The respondent is to establish an acceptance level of Type I error at standard deviation ( ) = 0.05, wherein any P-value greater than 0.05 means the process is normal. While P-value is less than 0.05 means otherwise. A p-value is a measure of the probability that an observed difference could have occurred just by random chance. The standard deviation is a statistic that measures the dispersion of a dataset relative to its mean and is calculated as the square root of the variance; standard deviation used the formula of

𝜎 .

= population standard deviation N = the size of the population 𝑥𝑖 = each value from the population µ = the population mean



## System Workflow Diagram

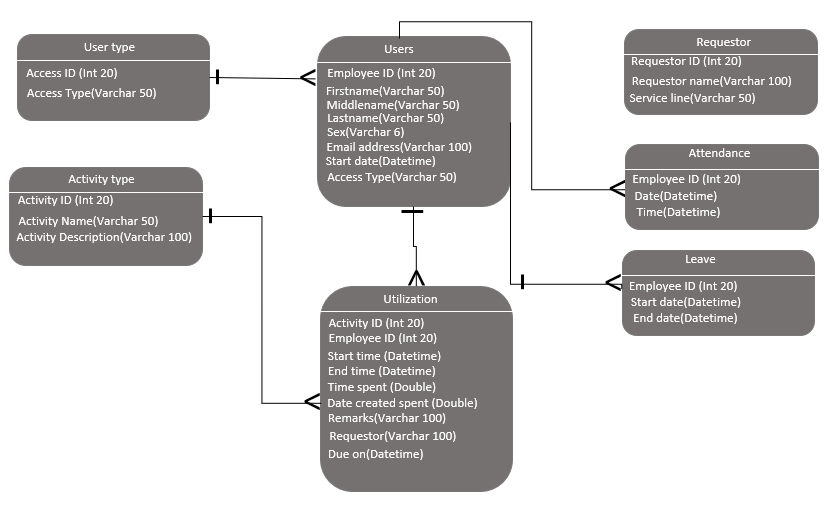


**Figure 3. System Workflow**

## System Workflow

The above system workflow model it explains and summarized the flow and the concept of the propose project study. It shows how users can interact with the system starting from the log in of user credential which required the user to input his/her email address and password. it also demonstrates how users can reset password by entering their email and how system match it on the record from the data and sending them an email containing their password. It also illustrates on the work flow the different type of user’s access levels which are the Task Administrator, Staff and the Manager, together with their different access privileged on the system, which is users can create new activities, acknowledge new task, create and manage activities, generate reports, amen task details and an access individual and team utilization.

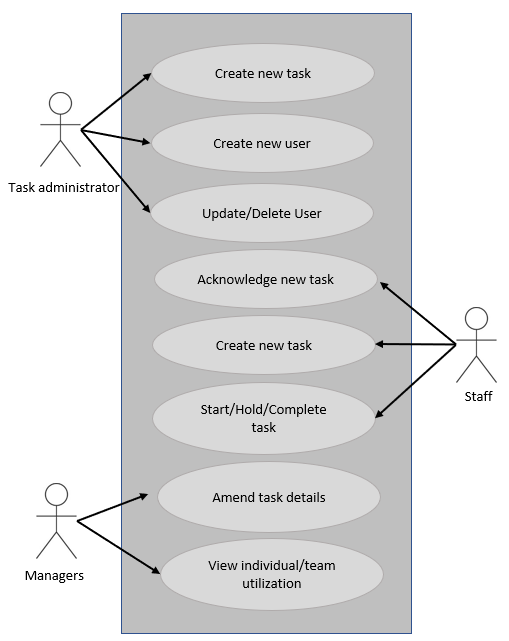
## Entity Relationship Diagram



## Figure 4. Entity Relationship

The above entity relationship diagram (ERD) is a graphical representation that depicts the relationship between the User Types, Activity types, Users, Utilization, Attendance, and Leaves in the proposed capstone projects it also shows the value of the table in the database.

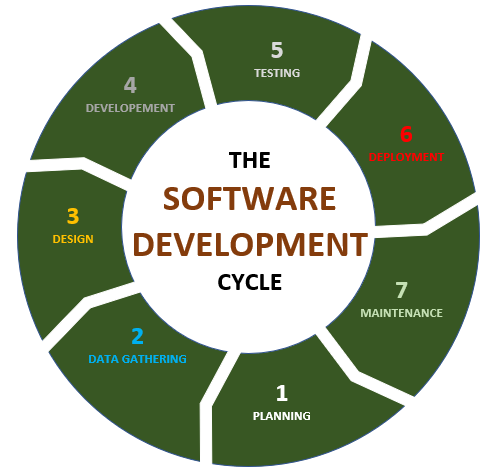
## Use Case Diagram



## Figure 5. System Use Case Diagram

The interactions between the system and its actors are depicted and identified in the above use case diagram. In use-case diagrams, the use cases and actors define what the system does and how the actors interact with it, but not how the system works inside. The above diagram also depicts the three categories of actors: Task Administrator, managers, and staff, as well as the proposed capstone project's eight key functions.

## System Methodology



## Figure 6. System Development Life Cycle

This chapter describes in depth how the project framework and design were created. The project's implementation and proof-of-concept development are also described. In addition, the methods used to collect data and the project's schedule are detailed. The researcher employs System Development Life Cycle Phases (SDLC) and uses scrum methodology to define the phases as a conceptual model that encompasses the procedures and policies required to develop or modify a system over the course of its life cycle. The end

product should be a high-quality system that meets or exceeds the

beneficiary’s expectations while keeping on schedule and within budget.

**Planning –** On the planning stage the researcher created the scope, schedule, and the cost of the propose capstone project it also created the timeline of the proposed capstone project. On this stage the researcher also prepared all the necessary question that can be used to the respondent for the researcher able to understand the problem of the beneficiary. The functional specification is a deliverable at this phase of the planning process. A web application's intended capabilities are outlined in this document and the beneficiary's approval and functional requirements.

**Data Gathering –** the researcher conducted a one hour interview with five respondent the Task Administrator of the Digital marketing team, two managers one staff and an IT expert to understand the current situation and existing system that they are using in their daily operations. The conducted interview gives insight and overview to the researcher on what is the current situation and problem of the respondents. During the data gathering and analysis stage of the project, I interview the project's beneficiary to obtain all important project information as well as all data required to perform the process in the system. I also considered the value of the data offered in the system and whether it is required.

**Design -** The proposed study will go through a proof-of-concept (POC) design implementation of data distribution, there will be not much complicated task in the designing code and data of this propose capstone study. Also, all data of this system will be going to deploy in a every user’s machine and a cloud-based platform for data storing. One of the project's deliverables in this stage is a desktop software prototype. It will be presented to the recipient in order to suit their requirements.

**Development -** For the recommended design implementation, C# programming language can be used and DAX function of Power BI for reporting. The proposed capstone research is a desktop application can be accessed through the use of an installed application. The development team and operations must be taught in its use, and the researcher utilized MSSQL to store all data in the database. At this time, the ERD will be moved to a real database. As part of this phase's deliverables, the deployed staging system will be used to demonstrate to the beneficiary.

**Testing -** All areas of the system's performance must be examined. At this point, any necessary modifications must be done. Quality assurance (QA) teams may execute tests such as systems integration and system testing in a QA environment, after which system operations can simulate deployment plans in a staging environment before releasing it to production. The intended deliverables at the testing stage of the project are to test all areas of the system's performance. At this point, any necessary modifications must be done. Expert tests might comprise systems integration and system testing in a QA environment to emulate all staging environments before the deployment. The testing phase will also include Alpha and Beta testing to ensure system function meet business requirement and user experience.

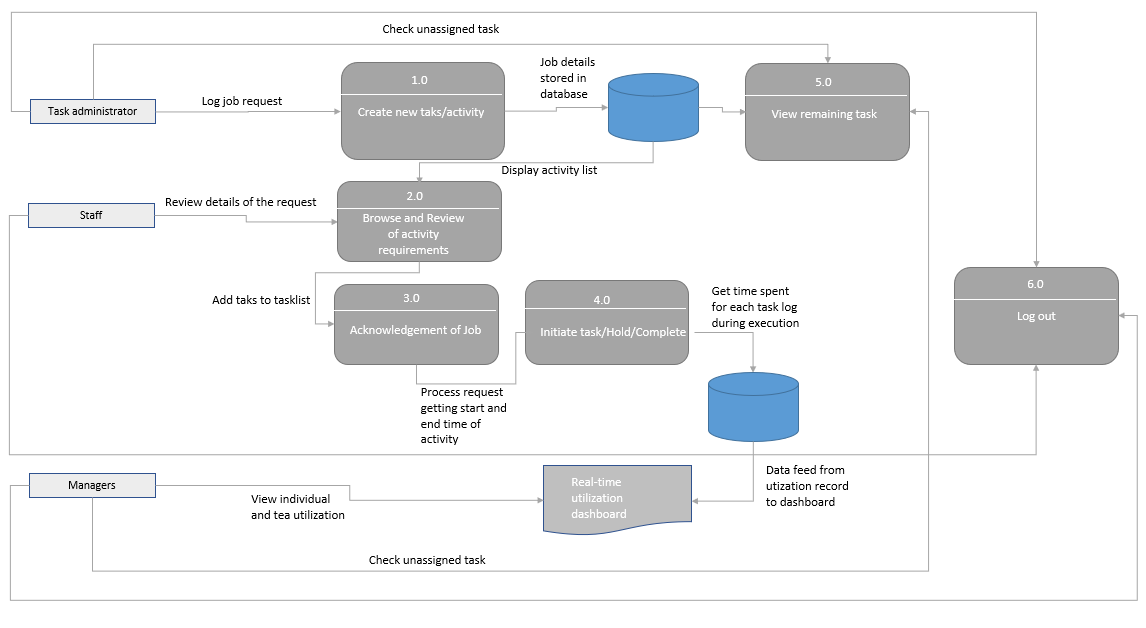
**Deployment -** The proposed capstone project implementation system will be used in a real-world setting. To apply all industry best practices, we may use the service reliability engineering framework. During this stage, an installation deployment guide will be created as well to have a successful deployment of the proposed system.

**Maintenance -** The targeted maintenance deliverable at this point in the project is to change and update the system once it is in place. This process entails altering and updating it. If something goes wrong during the deployment phase that the team was unable to catch during testing prior to deployment, a hotfix should be applied. System maintenance has been integrated, as well as monitoring to ensure availability and reliability.

## Software Development Tool

The suggested capstone project will be built utilizing the Dot net framework and C# programming language, a popular open-source Windows application framework that is mostly used for desktop application development. The proposed capstone research is a. MSSQL Azure Database was chosen as the system's data base, which will be kept on the cloud.

## Data Flow Diagram



## Figure 7. Data Flow Diagram

The data flow diagram illustration above shows the flow of all data from three access levels within the system: The Task Administrator, Staff, and Managers. It also shows all the process on the system and how data will be stored and generated.

The administration, it demonstrates how the Task Administrator will log and provide activity details. In addition, and security feature the Task Administrator also has an additional access to see and view the unassigned activities on the system to ensure no task are left behind from the system. The staff can acknowledge request and start working on it until it is completed. It also shows how managers can get individual and team utilization to optimize staff capacity to do tasks.

## Data Analysis and Visualization

After the visitation and discussion with the Digital marketing team, which is the beneficiary of the capstone project, we discussed that for the data analysis with the data visualization feature of the system, we are going to analyze all the data that has been processed and input to the system and transform all data into graphical representation using interactive visualization tools as a feature of the entire system.

The below data is the one that will be analyzed and transformed into a graphical representation. The following reports should answer the questions below.

1. How many activities were acknowledged and not acknowledged?
2. Identify those staff with low and high utilization rate.
3. How much time an individual or team spent in a daily and weekly basis for billable work?
4. Which individual or team has the capability to get more task?
5. Identify the top 10 requestors with higher utilization demand.
6. What kind of activity gets the highest utilization?
7. Count in progress task, completed by staff and team level.
8. Show demand trend in a monthly and quarterly basis.
   * Overutilize – 90% above
   * Fully Utilize – 70% to 89.9%

* Underutilize – Below 70%

## Purpose of the Study

The main purpose of the study is to design and develop a Desktop application software Smart Employee Resource Allocation and Capacity Optimization Analysis System for EY GDS Digital Marketing team. The software application consists of seven modules the Activity module, Employee module, Requestor module, Attendance & PTO module, Dashboard, PTO module, Task Administration.

The Software application have three user access the Staff, Managers, and the Task Administrator Access. The purpose of the system is to have standard process of, storing activity request details and duration time spent to analyze individual or team capacity to provide support using interactive data visualization tools of the system. With this capstone project it can help the managers to ensure resource are optimized effectively.

Another purpose of the study is to show and demonstrate how important the data visualization and graphical representation in our system today especially on the organization that is having a massive amount of data and to the IT industry.

**APPENDICES**

## Gannt Chart



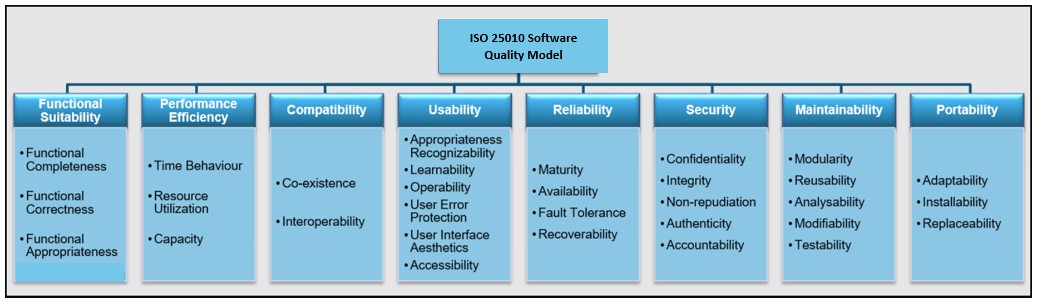
## Table 2. Gantt Chart

The above illustration is a project management tool used to assists in the scheduling, management, and monitoring of specified activities and resources. It also depicts the proposed capstone project's overall timeline. Above illustration also consists of all the list of tasks with weeks indicators for each activity. The project's timeline is also based on the project study's methodology, which is the System Development Life Cycle (SDLC), which includes planning, data gathering, design, development, testing, deployment, and maintenance.

## ISO 25010 Software Quality Model

The product quality model defined in ISO 25010 comprises the eight quality

characteristics shown in the following figure:



## Figure 8. Software Quality Model

The characteristics and sub-characteristics provide a uniform way of describing, measuring, and assessing the quality of the developed systems. With the ISO 25010 a collection of quality characteristics that can be used to check the completion of given quality standards.

QUESTIONNAIRE

I am performing survey to get insight into "Smart Employee Resource Allocation and Capacity Optimization Analysis System" for EY GDS Manila Digital Marketing Team and to identify if there is a significant between the current system and the proposed project in order to fulfill the final requirements for the Degree Master in Information Technology at Adamson University. I'm a survey of DMs’ Task Administrators, Staffs, Managers, and IT Experts.

This research is fully voluntary on your side. There are no risks affiliated with this project. However, if you don't feel comfortable answering any of the questions, you can withdraw the survey at any time or skip a question. Your feedback is very appreciated and will be really beneficial.

Your survey responses will be confidential, and results from this study will only be released in aggregate. Your information will be kept private. If you have any queries concerning the survey or the procedures, please contact Dominique Q. Adrias at (+63) 967-615-3379 or email at [Dominique.Adrias@adamson.edu.ph](mailto:Dominique.Adrias@adamson.edu.ph).

|  |  |
| --- | --- |
| **A. RESPONDENTS SUMMARY** | |
| **A01 -** Respondent Type IT Expert, DMs Task Administrator, Managers or Staffs |  |
| **A02 -** Name [optional] |  |
| **A03 –** Years of tenure [for staffs] |  |
| **A04 -** Years of tenure [for managers] |  |
| **A05 -** Position [for Task Admins and IT Experts] |  |
| **A06 -** Age [optional] |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **B1. FUNCTIONAL SUITABILITY**  **(Current System)** |  |  |  |  |  |
| **B01.1. Functional Completeness –** All of the tasks and objectives are covered by the current system. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **B01.2. Functional Correctness** – The current system provides accurate results with the required accuracy. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **B01.3. Functional Appropriateness –** The current system facilitates and accomplish the specified tasks and objectives. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **B2. FUNCTIONAL SUITABILITY**  **(Proposed System)** |  |  |  |  |  |
| **B02.1. Functional Completeness –** All of the tasks and objectives are covered by the proposed system. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **B02.2. Functional Correctness** – The proposed system provides accurate results with the required accuracy. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **B02.3. Functional Appropriateness –** The proposed system facilitates and accomplish the specified tasks and objectives. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **C.1 PERFORMANCE EFFICIENCY**  **(Current System)** |  |  |  |  |  |
| **C01.1. Time Behavior -** The response time of the current system through the process meets the criteria and requirements. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **C01.2. Resource Utilization –** The current system consumes less resource and time when performing a process and meets the criteria and requirements. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **C01.3. Capacity –** The current system capacity meets the criteria and requirements | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |

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| **C.2 PERFORMANCE EFFICIENCY**  **(Proposed System)** |  |  |  |  |  |
| **C02.1. Time Behavior -** The response time of the proposed system through the process meets the criteria and requirements. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **C02.2. Resource Utilization –** The proposed system consumes less resource and time when performing a process and meets the criteria and requirements. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **C02.3. Capacity –** The proposed system capacity meets the criteria and requirements | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |

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| **D.1 COMPATIBILITY**  **(Current System)** |  |  |  |  |  |
| **D01.1. Co-existence –** The current system can efficiently perform its required functions while sharing a common environment and resources with other products, with no negative consequences for any other product. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **D01.2 Interoperability –** The current system can exchange information and use the same information | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |

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| **D.2 COMPATIBILITY**  **(Proposed System)** |  |  |  |  |  |
| **D02.1. Co-existence –** The proposed system can efficiently perform its required functions while sharing a common environment and resources with other products, with no negative consequences for any other product. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **D02.2. Interoperability –** The proposed system can exchange information and use the same information | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **E.1 USABILITY (Current System)** |  |  |  |  |  |
| **E01.1. Appropriateness Recognizability –** By the used of current system users can assess whether the system is suitable for their requirements. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **E01.2. Learnability –** The current system can be used by specific users to achieve specific goals such as learning to use the application effectively, efficiently, safely, and satisfactorily. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **E01.3. Operability –** The current system has characteristics that make it simple to use and control. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **E01.4. User Error Protection –** By the used of current system users are protected from making mistakes by the system. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **E01.5. User Interaction Aesthetics -** By the used of current system user interface of the system allows for pleasant and satisfying interaction. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **E01.6. Accessibility -** People with a wide range of characteristics and abilities can use the current system to accomplish a specific goal in a specific context. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |

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| **E.2 USABILITY (Proposed System)** |  |  |  |  |  |
| **E02.1. Appropriateness Recognizability –** By the used of proposed system users can assess whether the system is suitable for their requirements. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **E02.2. Learnability –** The proposed system can be used by specific users to achieve specific goals such as learning to use the application effectively, efficiently, safely, and satisfactorily. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **E02.3. Operability –** The proposed system has characteristics that make it simple to use and control. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **E02.4. User Error Protection –** By the used of proposed system users are protected from making mistakes by the system. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **E02.5. User Interaction Aesthetics -** By the used of proposed system user interface of the system allows for pleasant and satisfying interaction. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **E02.6. Accessibility -** People with a wide range of characteristics and abilities can use the proposed system to accomplish a specific goal in a specific context. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **F.1 RELIABILITY (Current System)** |  |  |  |  |  |
| **F01.1. Maturity -** In normal operation, the current system meets the requirements for reliability. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **F01.2. Availability -** When needed, the current system is operational and accessible. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **F01.3. Fault Tolerance -** Despite the presence of hardware or software flaws, the current system functions as intended. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **F01.4. Recoverability –** The current system can restore the desired state and recover the data that was directly affected. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **F.2 RELIABILITY (Proposed System)** |  |  |  |  |  |
| **F02.1 Maturity -** In normal operation, the proposed system meets the requirements for reliability. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **F02.2 Availability -** When needed, the proposed system is operational and accessible. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **F02.3 Fault Tolerance -** Despite the presence of hardware or software flaws, the proposed system functions as intended. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **F02.4 Recoverability –** The proposed system can restore the desired state and recover the data that was directly affected. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |

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| **G.1 SECURITY (Current System)** |  |  |  |  |  |
| **G01.1. Confidentiality –** The current system ensures that data is only accessible to those who have been granted access. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **G01.2. Integrity –** The current system protects computer programs and data from unauthorized access or modification. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **G01.3. Non-repudiation -** The current system can be proven to have occurred, ensuring that the events or actions are irreversible. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **G01.4 Authenticity -** The current system has a degree to which the claimed identity of a subject or resource can be proven. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **G01.5. Accountability -** The current system has a degree to which an entity's actions can be traced back to the entity. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **G.2 SECURITY (Proposed System)** |  |  |  |  |  |
| **G02.1. Confidentiality –** The proposed system ensures that data is only accessible to those who have been granted access. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **G02.2. Integrity –** The proposed system protects computer programs and data from unauthorized access or modification. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **G02.3. Non-repudiation -** The proposed system can be proven to have occurred, ensuring that the events or actions are irreversible. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **G02.4 Authenticity -** The proposed system has a degree to which the claimed identity of a subject or resource can be proven. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **G02.5. Accountability -** The proposed system has a degree to which an entity's actions can be traced back to the entity. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |

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| **H.1 MAINTAINABILITY**  **(Current System)** |  |  |  |  |  |
| **H01.1. Modularity –** The current system is composed of discrete components to the extent that a change to one component has minimal impact on other components. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **H01.2. Reusability-** The current system has an ability to which an asset can be used in more than one system or more than one computers | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **H01.3. Analyzability -** The current system is effective and efficient enough to assess the impact on a product or the causes of failures, as well as to identify parts that need to be modified. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **H01.4. Modularity -** The current system is composed of discrete components to the extent that a change to one component has minimal impact on other components. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **H01.5. Reusability-** The current system has an ability to which an asset can be used in more than one system or more than one computers | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |

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| **H.2 MAINTAINABILITY**  **(Proposed System)** |  |  |  |  |  |
| **H02.1. Modularity –** The proposed system is composed of discrete components to the extent that a change to one component has minimal impact on other components. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **H02.2. Reusability-** The proposed system has an ability to which an asset can be used in more than one system or more than one computers | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **H02.3. Analyzability -** The proposed system is effective and efficient enough to assess the impact on a product or the causes of failures, as well as to identify parts that need to be modified. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
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| **I.1 PORTABILITY**  **(Current System)** |  |  |  |  |  |
| **I.01.1. Adaptability.** The current system has an ability to which a system can effectively and efficiently be adapted for different or evolving hardware, software or other operational environments. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **I.01.2. Install ability.** The current system has an effectiveness and efficiency in which a system can be successfully installed and/or uninstalled in a environment. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **I.01.3. Replace ability.** The current system to which a product can replace another software product for the same purpose in the same environment. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **I.1 PORTABILITY**  **(Proposed System)** |  |  |  |  |  |
| **I.01.1. Adaptability.** The proposed system has an ability to which a system can effectively and efficiently be adapted for different or evolving hardware, software, or other operational environments. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **I.01.2. Install ability.** The proposed system has an effectiveness and efficiency in which a system can be successfully installed and/or uninstalled in a environment. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |
| **I.01.3. Replace ability.** The proposed system to which a product can replace another software product for the same purpose in the same environment. | 100-1.80 | 1.81-2.60 | 2.61-3.40 | 3.41-4.20 | 4.21-5.00 |

**ACCEPTANCE LETTER**

**EY GDSPI Digital Marketing Team**

Lawton Ave, Mckinley West, Taguig, 1634 Metro Manila

October 10, 2022

**Dominique Q Adrias**

2257 Aurora Blvd. Pasay City, 1300

**Subject: Capstone Project Acceptance Form**

Dear **Mr. Dominique Q. Adrias,**

After some further review and carefully studying your project proposal that you gave to us, and after I have discussed it with the managers an DM member of EY GDS Manila, we have decided to accept your capstone project proposal.

We wish you all the best and we are looking forward to you completing the project as per the requirements.

Yours sincerely,



Rae Barry Vergara

Assistant Director

EY GDSPI Digital Marketing Team

**LETTER OF AGREEMENT**

**Dominique Q. Adrias**

**Student and Researcher**

2257 Aurora Blvd. Pasay City, 1300

**October 22, 2022**

**Mr. Rae Barry Vergara**

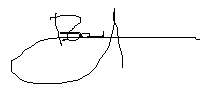
Assistant Director

EY GDSPI Digital Marketing Team

Lawton Ave, Mckinley West, Taguig, 1634 Metro Manila

Dear **Mr. Rae Barry Vergara**,

This letter serves as a formal agreement between **Dominique Q. Adrias (Student)** and **EY GDSPI Digital Marketing Team** where **Dominique Q. Adrias student** and **researcher** from **Adamson University** will develop a **Smart Employee Resource Allocation and Capacity Optimization Analysis System for EY GDSPI Digital Marketing Team** as the **beneficiary** of the capstone project.



\_Dominique Q. Adrias\_\_\_\_\_\_\_\_ Rae Barry Vergara \_\_\_\_\_\_

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