

# Application of Data Analytics in the Human Resources Information System in Selected Companies in Metro Manila

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**Abstract:** This study focused on the application of data analytics in the human resources management information system in the selected IT services companies in Metro Manila, namely Makati City, Pasig City and Quezon City. Five IT companies were selected in every city. Five members of the management committee of each company were selected as eligible to answer the questions of this study, with a total of seventy-five (75) respondents. The objective of the study was to realize the application of data analytics in the human resources information system and to find the meaning of data analytics. The derived knowledge will be used to equip the human resources department or organizations with a smarter decision, productivity effectiveness and efficiency and better improvement. This study exercised the quantitative research methodology to answer the statement of the problem; the quantitative method was used to answer the questions. To test the consistency and reliability of the research, this study used the open-ended interview with the respondents to determine the applications of data analytics in human resources management information system. The data collected were used for the hypothesis to answer the question.

**Keywords:** Data analytics, human resources information system.

## 1. Introduction

Things are changing fast, and the world is becoming more complicated every day. Almost everything at work can be measured, from the employee's day – to – day actions, concentration, happiness and well being, to wider business operations. The explosion in data means human resources (HR) teams have at their fingertips more data – and the potential for more insights. Companies are nothing without the right people. Those companies which are able to attract people with the right skills and talent are most likely to have the competitive edge needed to succeed now and in the future. It is therefore vital that companies put in place the intelligent systems to hire and retain the right people.

Clearly, human resources is at the very center of this need. Yet, too many human resources teams spend the majority of their time on administration task and or to legal issues. The day-to – day minute of finding and managing people and wasteful, expensive activities like around staff satisfaction survey, take up time that could be better spend elsewhere. One of the core competencies of an HR professional is the ability to understand

how technology impacts current process and how technology can be used to maximize efficiency while not damaging the strong interpersonal relationships required to do the business.

HR needs to look at the challenges of technology and the impact it has on the work, for example, who could have imagined the impact social media has had on recruiting and what about the unique challenges does Human Resources practitioner facing in managing people who don't work in the same place they do may be not even in the same country but they can keep connected using a wide variety of technological solution (Marr 2020).

Human resources practitioners use technology to develop employees by using virtual meeting software and other high-tech resources to keep employees up – to – date on new policies and procedures. Human resources and information technology can work to ensure critical data integrity is maintained. Therefore, human resources need to be able to have strong links with technology partners in order to maximize the benefits of the new technologies, for their services in the organization (Barbara & Gamlem, 2017).

As the role of technology becomes multi-fold in every sector, it generates huge amounts of information that can yield valuable insights about the field. This has led to a boom in the data industry in the last ten years. However, data collection needs to be supplemented with its analysis for obtaining decision-making insights. Data analytics helps businesses and industries make sense of the vast volumes of information for further growth and development. Finally, investing in analytics is the difference between successful and failing companies in the present and the years to come (Metsler, 2020).

The researcher purported to help the company and the human resources department to achieve an excellent performance in the operations of human resources and to extend the objectives and goals to be likely in a smooth running. These aim for the significance of Data Analytics application in the human resources information system; with a thorough understanding, this study will guide the organization and human resources department to merge a discipline in a particular activities and processes with information technology field. The programming of data processing system will evolve into standardize routines

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of enterprise resource planning.

### A. Theoretical Framework

This study was anchored on the theory of data analytics, the theory that explains why the research problem under study exists. Worldwide spending on big data analytics solutions is predicted to be worth over \$274.3 billion by 2022 – and it is not just large corporations investing. Research shows that nearly 70% of small businesses spend more than \$10,000 a year on analytics to help them better understand their customers, markets and business processes. The overwhelming majority of executives say that their organization has achieved successful outcomes from Big Data and Artificial Intelligence. Data can also have a big impact on the bottom line, with businesses that utilized big data increase to improve internal and external customer retention strategies. Business Analytics is the process by which businesses use statistical methods and technologies for analyzing data in order to gain insights and improve the strategic decision-making (University of Bath, 2021).

The methods of data analysis are used by businesses to generate those impressive results which are the Descriptive, Predictive and Prescriptive Analytics. There are three types of analytics that businesses use to drive decision making: descriptive analytics, which tell us what has already happened; predictive analytics, which show us what could happen, and the prescriptive analytics, which inform organization what should happen in the future. Each of these methods are useful when used individually, they become especially powerful when used together. Descriptive analytics is the analysis of historical data using two key methods – data aggregation and data mining - which are used to uncover trends and patterns. It is not used to draw inferences or make predictions about the future from its findings; rather it is concerned with representing what has happened in the past. This is often displayed using visual data representations like line, bar and pie charts and, although they give useful insights on its own, often act as a foundation for future analysis. Because it uses fairly simple analysis techniques, any findings should be easy for the wider business audience to understand (University of Bath, 2021).

Predictive analytics is a more advanced method of data analysis that uses probabilities to make assessments of what could happen in the future. Like descriptive analytics, prescriptive analytics uses data mining – yet, it also uses statistical modelling and machine learning techniques to identify the likelihood of future outcomes based on historical data. To make predictions, machine learning algorithms take existing data and attempt to fill in the missing data with the best possible guesses. These predictions can then be used to solve problems and identify opportunities for growth. Another branch of predictive analytics is deep learning, which mimics human decision-making processes to make even more sophisticated predictions. Predictive analytics shows companies the raw results of their potential actions while prescriptive analytics shows companies which option is the best. The field of prescriptive analytics borrows heavily from mathematics and computer science, using a variety of statistical methods. Although closely related to both descriptive and predictive

analytics, prescriptive analytics emphasizes actionable insights instead of data monitoring. This is achieved through gathering data from a range of descriptive and predictive sources and applying them to the decision-making process. What makes prescriptive analytics especially valuable is the ability to measure the repercussions of a decision based on different future scenarios and then recommend the best course of action to achieve company's goals. The business benefit of using prescriptive analytics is huge. It enables teams to view the best course of action before making decisions, saving time and money whilst achieving optimal results. Businesses that can harness the power of prescriptive analytics are using in a variety of ways (University of Bath, 2021).

Application of data analytics is the new hero of human resources in recruitment. The success of company is directly related to its people, In fact, 71 percent of CEO's view human capital as the top factor for sustainable economic value. According to a report by Harvard Business Review, 43 percent saying that investing in people is a major priority. It's no wonder, then, that employers and recruiters are continually improving their methods of finding, hiring and retaining top candidates. Data analytics provides hiring managers with predictive power and more accurate insight into candidates' skills, roles, suitability to companies and can point to where the best candidates are located (University of Bath, 2021).

Application of data analytics in Human Resources Information System in Forecasting workforce enables the human resources team to make predictions about areas of the entire human resources function – from the cultural fit of an employee, the feeling to remain engage on the job, the ability to upskill and stay relevant to the industry they are working in, and the chance to spend a certain duration in the job. This helps quantify qualitative data by assigning a score to the different areas that need to be measured in demonstrating the likelihood of an event occurring (Wiblen, et al. 2010).

Application of data analytics (Weber, 2017) in Human Resources Information System in Communication Process between HR department and Employees can quantify the requirements of human resources department. It is the human resources department's responsibility to hire effective employees and prepare those employees to perform assigned tasks correctly. Communication plays a key role in the relationship. It is used in human resources to relay information from directors to employees. This information pertains to company policies or the companies' goal. Effective communication increases productivity, which benefits employees and the company with proper communication techniques, this means it can boost employee morale to create a positive work atmosphere.

Human Resources practitioners can evaluate every potential and current employee's communication skills, and provide each with personalized improvement recommendations and learning resources to aggregate program-level. Data analytics will help managers identify common challenges among teams and throughout the organization and will help to fill the gap between employees and the employers (Weber, 2017).

According to McGuire (2013), across industries, data

analytics helps businesses to become smarter, more productive, and better at making predictions. No organization can function without data these days, with huge amounts of data being generated every second from business transactions, sales figures, customer logs, human resources and stakeholders; data are the fuel that drive companies. These data need to be analyzed to enhance decision making. Nonetheless, there are a number of challenges to overcome too, and these include data quality, storage, lack of data science professionals, validating data, and accumulating data from different sources. Analytics has become a top-of-mind issue for business leaders around the world for very simple reasons, it is going to define the difference between winners and losers in most of the industries going forward.

It is therefore necessary to determine which data to use, how to source it, and how to get it together into an integrated form that can be used across the company, getting that right, getting the right skills and capabilities, getting people who really know how to use the latest mathematical techniques and the latest statistical methodology to get inside that data and find the real nuggets of gold (McGuire, 2013).

**B. Conceptual Framework**

The researcher used the Input – Process – Output conceptual framework to give a visual perspective on the general structure and direction of the study.

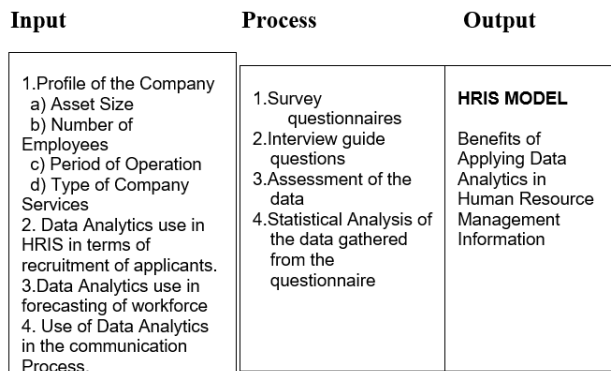


Fig. 1. Research paradigm

Figure 1 shows the first frame which contains the input of the study. This includes the following: the profile of the company, data analytics used in HRIS in terms of recruitment of the applicant, data analytics used in forecasting of workforce, use of data analytics in the communication process between human resources department and employees, the relationship between recruitments and forecasting of workforce, and the data analytics model may be used by the IT companies.

The process covers the survey questionnaire, interview guide questions, assessment of the data and statistical analysis of the data gathered from the questionnaire. The output reflects the benefits of IT companies in applying data analytics in human resources information system.

**C. Statement of the Problem**

The principal concern of the study was to examine the different applications of data analytics in the human resources

management system. Specifically, the study sought to answer the following questions:

1. What is the company profile on the following;
  - 1.1 asset size,
  - 1.2 number of employees,
  - 1.3 period of operation, and
  - 1.4 type of company services
2. How is the data analytics used in the human resources information system in terms of recruitment of the applicants?
3. How is data analytics used in the forecasting of the workforce?
4. What is the relationship between recruitment of applicant and forecasting of workforce.
5. What is the use of the data analytics in the communication process between the human resources department and the employees?
6. What data analytics model may be proposed for IT companies?

**D. Hypothesis**

This study tested the hypothesis that there is no significant relationship between the recruitment of applicants and the forecasting of the workforce.

**E. Scope and Delimitation of the Study**

The goal of the study was to determine the best practices of an IT company in the applications of data analytics in the human resources.

Information System of the selected IT services companies in Metro Manila. The researcher chose the management committee members as respondents because they are reason for the exemplary persons to answer the questions and are the most familiar regarding Information Technologies protocols and implementations of the company.

This study was conducted during the School Year – 2nd Semester 2020- 2021 in the cities of Makati, Pasig and Quezon. A pilot testing was performed before disseminating the questionnaire to the five (5) selected companies in the three (3) cities of Metro Manila, with a total of seventy-five (75) respondents. Copies of the questionnaire were distributed to the selected respondents through personal distribution and electronic mail, after approval from the company’s general managers. This considered every aspect of the respondents that has an impact on the application of data analytics in human resources information system according to the company profile. The goal of the study was to consider the benefits of IT companies in applying data analytics in human resources information system

**F. Significance of the Study**

- This study may be beneficial to the following:
- Companies may be given specific various concepts, theories and frameworks on applying data analytics in human resources management information system especially on IT company.
  - Employees may use this study to have a finer understanding and knowledge of the benefits of data analytics in the human

resources information system.

HR Practitioners may be guided on the issues and challenges on applications of the data analytics in Human Resources Information System.

Management Committees may make use of this study as reference for the applications of data analytics in human resources information system to improve company processes and procedures and will guide them in a progressing and smooth operations of their division.

Future Researchers may make use of the data and findings of this study for their wider scope of research on applications of data analytics in human resources information system on recruitment of applicants, forecasting of workforce and communication process between human resources department and employees.

### G. Definition of Terms

For better understanding of the study, the following operational terms are defined;

Asset size is a term used for the capital fund of the company.

*Communication Process* refers to the support to Human Resources, to oversee the development and implementation of a company's communication strategies that directly affect the employees (Grimsley, 2014).

*Data Analytics* refers to descriptive, diagnostic, predictive and prescriptive analytics. Each type has a different goal and a different place in the data analysis process. These are also the primary data analytics applications in business. (Stedman, 2021).

*Forecasting Workforce* refers to HR projecting short term and long-term labor needs, types of workers, HR planning and analyzing the various costs administrative work that go along with adding or downsizing workers and the effects to the organization (Milano, 2019).

*Human Resources Analytics* is the area in the field of analytics that deals with people analysis and applying analytical process to the human capital within the organization to improve employee performance and retention (Lalwani, 2021).

*Human Resource Department* is the department in a organization charged with finding, screening, recruiting, training and development of the employees as well as the administering the employee's benefit.

*Human Resources Information System* refers to the system used to acquire, manipulate, retrieve and distribute information in organization, this includes people, forms, policies and procedures and data (Perucci, 2018).

*IT Services* refer to the respondent type of companies services to the client.

*Management Committee* is the group of people who are held accountable for the activities of the organization. It is the ultimate decision-making forum, and they will be the respondent of this study.

*Principal of Activity* is a term used for the nature and the record of operation of the company.

*Recruitment* is an intended process of attracting suitable people to fill up vacant positions in an organization in accordance with human resource planning (Maximiano, 2010).

*Recruitment Analytics* is a combination of data and predictive analysis that provides real-time information to help one hires faster. Powerful recruiting analytics helps explore every aspect of business, turn data into actionable insights, and make better recruiting decisions faster (Vulpen, 2020).

## 2. Review of Related Literature

This section presents the review of related literature including the relevance of related literature and studies.

### A. Data Analytics

According to Stedman (2021), as the process of analyzing raw data to find trends and answer questions, the definition of data analytics captures its broad scope of the field. However, it includes many techniques with many different goals. The data analytics process has some components that can help a variety of initiatives. By combining these components, a successful data analytics initiative will provide a clear picture of where the companies are and where they have been and where they should go.

Generally, this process begins with descriptive analytics. This is the process of describing historical trends in data. Descriptive analytics aims to answer the question "what happened?" This often involves measuring traditional indicators such as return on investment (ROI). The indicators used will be different for each industry. Descriptive analytics does not make predictions or directly inform decisions. It focuses on summarizing data in a meaningful and descriptive way. And the next essential part of data analytics is the advanced analytics. This part of data science takes advantage of advanced tools to extract data, make predictions and discover trends. These tools include classical statistics as well as machine learning. Machine learning technologies such as neural networks, natural language processing, sentiment analysis and more enable advanced analytics. This information provides new insight from data. Advanced analytics addresses "what if?" questions. The availability of machine learning techniques, massive data sets, and cheap computing power have enabled the use of these techniques in many industries. The collection of big data sets is instrumental in enabling these techniques. Big data analytics enables businesses to draw meaningful conclusions from complex and varied data sources, which has been made possible by advances in parallel processing and cheap computational power.

Stedman (2021) added that data analytics is a broad field, which has four primary types, the descriptive, diagnostic, predictive and prescriptive analytics. Each type has a different goal and a different place in the data analysis process, which are also the primary data analytics applications in business. In descriptive analytics, it helps answer questions about what happened. These techniques summarize large data sets to describe outcomes to stakeholders. By developing key performance indicators (KPI's), these strategies can help track successes or failures. Metrics such as return on investment (ROI) are used in many industries. Specialized metrics are developed to track performance in specific industries. This process requires the collection of relevant data, processing of

the data, data analysis and data visualization. The process provides an essential insight into past performance. The second analytics is the diagnostic analytics, this helps answer questions about why things happened. These techniques supplement more basic descriptive analytics. They take the findings from descriptive analytics and dig deeper to find the cause. The performance indicators are further investigated to discover why they got better or worse. This generally occurs in three steps which identify anomalies in the data namely, global outliers, contextual outliers, and collective outliers. These may be unexpected changes in a metric or a particular market.

Furthermore, the data that are related to the anomalies are collected, statistical techniques are used to find relationships and trends that explain anomalies is the predictive analytics which helps answer questions about what will happen in the future. These techniques use historical data to identify trends and determine if they are likely to recur. Predictive analytical tools provide valuable insight into what may happen in the future and its techniques include a variety of statistical and machine learning techniques, such as: neural networks, decision trees, and regression and prescriptive analytics helps answer questions about what should be done. By using insights from predictive analytics, data-driven decisions can be made. This allows businesses to make informed decisions in the face of uncertainty. The last analytics is the prescriptive analytics, these techniques rely on machine learning strategies that can find patterns in large datasets. By analyzing past decisions and events, the likelihood of different outcomes can be estimated. These types of data analytics provide the insight that businesses need to make effective and efficient decisions. Used in combination they provide a well-rounded understanding of a company's needs and opportunities.

Moreover, data analytics exist at the intersection of information technology, statistics and business. They combine these fields in order to help businesses and organizations succeed. The primary goal of a data analyst is to increase efficiency and improve performance by discovering patterns in data. The work of a data analyst involves working with data throughout the data analysis pipeline. This means working with data in various ways has the primary steps in the data analytic where processes are the data mining, data management, statistical analysis, and data presentation. The importance and balance of these steps depend on the data being used and the goal of the analysis. To be detailed on the steps, the first step in the data mining is an essential process for many data analytics tasks. This involves extracting data from unstructured data sources. These may include written texts, large complex databases, or raw sensor data. The key steps in this process are to extract, transform, and load data (often called ETL). These steps convert raw data into a useful and manageable format. This prepares data for storage and analysis.

Data mining is generally the most time-intensive step in the data analysis pipeline. The second step is the data management or data warehousing which is another key aspect of a data analyst's job. Data warehousing involves designing and implementing databases that allow easy access to the results of data mining. This step generally involves creating and

managing SQL databases. Non-relational and NoSQL databases are becoming more common as well. The third analysis allows analysts to create insights from data. Both statistics and machine learning techniques are used to analyze data. Big data are used to create statistical models that reveal trends in data. These models can then be applied to new data to make predictions and inform decision making. Statistical programming languages such as R or Python (with pandas) are essential to this process. In addition, open-source libraries and packages such as Tensor Flow enable advanced analysis. Finally, the last step in most data analytics processes is the data presentation. This step allows insights to be shared with stakeholders. Data visualization is often the most important tool in data presentation. Compelling visualizations can help tell the story in the data which may help executives and managers understand the importance of these insights (Stedman, 2021).

Stedman (2021) also reiterated that the applications of data analytics are broad. Analyzing big data can optimize efficiency in many different industries. Improving performance enables businesses to succeed in an increasingly competitive world. One of the earliest adopters is the financial sector. Data analytics has an important role in the banking and finance industries, used to predict market trends and assess risk. Credit scores are examples of data analytics that affect everyone. These scores use many data points to determine lending risk. Data analytics is also used to detect and prevent fraud to improve efficiency and reduce risk for financial institutions.

As reported by KInley (2016), the use of data analytics is vital in most business organizations especially in the Human Resources Department. He said that the success of any company is directly related to its people. In fact, 71 percent of CEOs view human capital as the top factor for sustainable economic value, according to a report by Harvard Business Review, with 43 percent saying that investing in people is a major priority. Employers and recruiters are continually improving their methods of finding, hiring and retaining top candidates. Eventually, data analytics looks to be the new hero in human resources department, respectively the recruitment process and forecasting workforce. For example, career expert Huhman (2014), said that most hiring managers had always relied on data to make decisions. IQ tests and skills aptitude tests have been relied on to determine whether someone should be hired or fired. The shift to big data just means the questions will become more nuanced and the answers more telling. Hiring managers can use data to assess whether a candidate will be the best fit for the role, how long they will likely stay with the company and what their levels of engagement will be. A similar idea to that is suggested by Sharma (2019) that data such as university grade-point averages, educational qualifications and work history have always provided insight for determining a candidate's potential. But these days, HR teams gather data from personality traits such as the candidate's overall happiness quotient. This adds another layer of assessment beyond skills and experience.

Another example is given by LinkedIn which is launching the beta phase of its Talent Insights this year 2021, according

to Lunden (2017). She explained the self-service, big data analytics product which makes it easier for recruiters to delve deeper into statistics for hiring and employment. LinkedIn says its Talent Insights will give organizations on-demand access to its real-time data and insights on talent pools and companies. The reports will provide easy-to-understand visualizations of their data for exporting and sharing, with business leaders and key stakeholders. Systematically, this information will come from talent pool and company report functions, with the former providing insight into where candidates live and the industries and companies in which they work. It also provides hiring managers with information to help gauge the best schools from which to source candidates, and how employees are engaging with the company and recruiters will have the access to data about companies' workforce, the talent they lose and gain, the dominant skills in the organization to help determine how best to attract candidates. For this purpose, applying data analytics in the Human Resources Information System helps the company understand its engagement levels better. It allows to improve employee recruitments, reduces hiring bias job analysis and inventory, corporate communication, and accurate forecasting of labor and supply of the company. Data analytics in the Human Resources Information System for recruitment is the process of using historical data to make predictions about future hiring activities and candidates. It is all about collecting and analyzing data using statistics, machine learning, and modeling techniques to best predict what could happen under specific scenarios, Intelligent and efficient sourcing and Faster and more targeted hiring. Conclusively, recruitment agencies and HR team leaders need to transform to meet evolving business demands. Favorably, data analytics is the key to showing a precise picture of hiring needs, candidates attraction and successfully predicting with campaign and approaches that will attract the right talent (McConnell, 2019).

The availability of a robust data analytics in the Human Resources Management System Information (HRIS) in an organization can play a crucial role in determining the effectiveness of Human Resource Planning in an organization including Job Analysis. A well-developed HRIS can enable availability of crucial information or data regarding the human resources and accordingly result in accurate projections for the future requirements. Job analysis involves gathering information and analysis of information of crucial information about a job. In this analysis judgment are made on the data collected of a job. Job Analysis involves both Job Description and Job Specification, which includes an assessment of the nature of the job as well as the knowledge, skills and attitude of the jobholder (Mayo, 2019).

Additionally, according to Maheshwari (2014), the term data analytics refers to the process of examining data sets to draw conclusions about the information they contain. Data analytic techniques enable the organization to take raw data and uncover patterns to extract valuable insights. Currently, many data analytics techniques use specialized systems and software that integrate machine learning algorithms, automation and other capabilities. Data scientists and analysts use data analytics techniques in their research, and businesses also use it to

formulate their decisions. Data analysis helps companies better understand their customers, evaluate their ad campaigns, personalizes content, creates content strategies, develops products and improves the human resources department. Ultimately, business organizations can use data analytics to boost business performance and improve their bottom line.

Data have the potential to provide a lot of value to businesses, but to unlock that value, an organization needs the analytics component. The analysis techniques provide businesses access to insights that can help to improve their performance. It can help improve knowledge of customers, ad campaigns, budget, employees and more. As the importance of data analytics in the business world increases, it becomes more critical to sustain efficient operations, Data analytics can help organizations streamline the processes, save money and boost their bottom line. With improved understanding of what the audience wants, organizations waste less time on creating ads and content that don't match the audience's interests. This means less money wasted as well as improved results from the campaigns and content strategies.

Maheshwari (2014) cited that data analytics can predict the behaviors of users. By collecting various kinds of data from numerous sources, organizations can gain insights from audiences and campaigns that help improve the target and better predict future customer behavior. One valuable type of data is information about customer behaviors. This refers to data about specific actions that a user takes. For instance, click on and make a purchase, comment on a news article or like a social media post. This and other types of data can reveal information about customer affinities — expressed or suggested interest in activities, products, brands and topics. A customer may express interest in the brand by signing up for email list. They may also indirectly express interest in a topic by reading about it on the website. They may express interest in a product by clicking on one of the ads for it. Some other potential sources of customer affinity data include survey responses, social media likes and video views. By combining this data with information about current customers' demographics, organizations can gain insights into the customer segments that are most likely to be interested in the brand, content or products. Demographic information includes information about customers' ages, genders, income, marital status and various other characteristics. For example, the marketing data-based profile of target market may find, through data analytics, that people between the ages of 18 and 35 are the most likely to purchase the product. It may also find that people who are married make up most of the website's audience. By targeting multiple characteristics, organizations can create more specific audiences who are highly likely to convert such marketing data-based profile of target market.

#### *B. Data Analytics in Human Resources Recruitment of Applicants*

HR analytics need reliable data to make good decisions, and HR needs to embrace analytics and do it as quickly as possible. Google has been a leader in this area. They've figured out that data can help assess the effectiveness of programs and

processes, and most importantly, help the organizations make better decisions about what is important both to the organization and to its people. It's about using data to drive everything related to employees. Organizations used to make decisions based on what they thought was the right thing to do and that might have been based on research but most often was based on the latest trend or newest product out there! Now, they can use real data to make better decisions.

This trend has been difficult for HR professionals who don't feel comfortable with data. However, they need to get on board with analytics and understand that using data to make better decisions makes them more valuable to the organizations. They need to understand the organization and how it operates in order to determine which analytics they need to study. Using data to make the point can be extremely powerful and can make it much more impactful for an HR leader. Some of the data will be available from HR systems; however, HR may need to collect additional data using surveys or focus groups. Take the first step and learn what they already have available and fill in the gaps (Barbara & Gamlem, 2017).

According to Alwehabe (2017), there is a statistically significant positive relationship between planning efficiency of human resources and every dimension of institutional performance, between efficiency of selection strategies, recruitment and each dimension of institution's performance. The use of an HRIS offers incremental leaps in the efficiency and the response time of many human resource jobs that are traditionally labour intensive. The objective of the study was to identify the efficiency and effectiveness of human resource management strategies, in Al Rajhi bank at Al Qassim, in relation to its institutional performance. This study proved that efficiency in the HR department is beneficial to the company as a whole. Therefore, there is a need to further increase the efficiency of the HR department if the company wants to increase the overall efficiency of their business. This need can be fulfilled by the implementation of the HRIS, which is proven in a research done by Benfatto (2010), who claimed that efficiencies created by technology can allow the human resources department to focus on strategic issues that, for most companies includes knowledge management and companies can now use technology to store best practices.

Denisi and Griffin (2015) elaborated that the basic level of HRIS is used to help to manage employment relationships within the organization and employees. The organization can use HRIS for human resource planning. New recruitments can be posted via HRIS as well as applications can be scanned and stored. HRIS also stores information about the employees' participated trainings and learning sessions. Performance appraisal, compensation, benefits, competences and development plans are easily maintained in HRIS. Employees can search for a new career within the organization and be aware of the future trainings. HRIS allows managers to follow employees' job performance and planned versus used hours for a certain assignment. HRIS offers various reports available. HR or managers are able to run reports to find skilled employees for certain jobs. Via 2015 reports, that it is easy to present information about absences, holidays, language skills,

operatives and many more. HRIS contains various standard reports but it also allows generating other reports.

Maron (2018) stated that the process of hiring a suitable candidate is arduous. A recruiter has to flip through thousands of resumes to shortlist the best ones. With manual screening, the process becomes cumbersome, error-prone, and time-consuming. For this reason, having recruitment analytics systems in place can save employer a lot of headaches. Recruitment as a data-driven process and the use of data and effective analytical processes can be powerful tools for a recruiter. HR analytics makes predictive analysis easier and helps managers to make a better choice based on historical data. HR analytics also prevents companies from making mistakes by understanding the past errors. It also includes re-assignment of the staff in a cross functionality. This means candidate records often go untouched once they apply for the role or after the job posting is closed. Analytics allows total to re-engage a targeted group of candidates to determine their level for other available positions in the company.

It can also help to reflect new positions, work experiences or skills that may have been acquired by the candidates since the last time they were engaged. It can also detect employee development in terms of training, which is an essential part of workforce management for any company. However, if there are any gaps in the training process, it could cause some serious problems and increase the cost to the company. The use of analytics tools helps to identify if employees are making the full use of the opportunities and the knowledge imparted to be able to forge ahead in their various entities. Additionally, it can also diagnose the employee attrition. HR analytics is an important tool for human resources managers to identify the reasons why employees leave or stay with the organization. It is highly effective in finding the skill gaps and areas where employees are struggling. Various tools like employee's satisfaction surveys, team assessments, exit and stay interviews can be used to identify the reasons for employee attrition and the strategies to retain them. A machine learning can be used to build models to know the expected employee's attrition rate in the coming time. It uses parameters such as age, income, satisfaction level, years in the company, and other important factors to know how many employees are on a lookout for a change. These analytics can be used to take preventive measures and retain valuable employees in the organization.

Mare (2016) remarked that digital technology has provided new avenues for recruiters to think and act creatively. Instead of relying on old, manual approaches, digital analytics give the ability to radically alter the way one sources, recruits and ultimately works. Recruiters today can easily create extensive talent profiles of each role on their CRM. These profiles can contain details of experience, skills and qualifications required for each role. Over time, the data collected from roles and applicants will start to paint a picture. Databases today are built to categorize this information, clearly referencing which talent profiles you're marketing and job adverts are attracting. These data allow organizations to tailor the marketing approach by appealing to the specific talent needed today and tomorrow.

The benefits are evident and screening activities become

more productive. Analytics allows recruitment agencies and HR teams to measure how many interviews are required to place a job, the average time to hire, or how much every candidate registration costs the business. KPIs and processes can be implemented around this new-found business intelligence. When staffing is a major cost for a lot of businesses, achieving this outcome can make a big difference to the bottom line. As businesses become more analytics-driven, they will be able to forecast future resource requirements and hire the right people. Conclusively, recruitment agencies and HR teams need to transform to meet evolving business demands. Data analytics is the key to showing a precise picture of hiring needs, candidate attraction, and successfully predicting which campaigns and approaches will attract the right talent. The future is clear – injecting data and analytics into recruitment processes will be your most powerful weapon in the war for talent.

### *C. Forecasting Workforce in Human Resources*

According to Dyson (2019), workforce forecasting in HR analytics has become a key focus point for HR professionals around the world as they confront new challenges in finding and retaining the right employees. As technology advancements, HR systems are bringing in more data and key insights into the dynamics of workplaces. Workforce forecasting is becoming an essential business process for companies of all sizes. Many companies struggle with this process as it involves aligning talent management with business objectives. so that a company can meet its regulatory, service and production requirements. Forecasting workforce is a finance-led process for a great majority of companies, focused primarily on managing headcount to budget to ensure there are no cost overruns. The standard procedure is that average cost-per-head count allocations are made, and hiring is closely monitored. Collecting essential data points is a key step in a data-driven HR program. The data needed for analysis may come from multiple divisions within an organization. Evaluating current internal HR data can help organizations identify future needs and draft a workforce strategy around them.

Many organizations have inward-focused approach to workforce analytics and HR data and do not take into account what is going on outside the organization. The labor market is rapidly changing. Labor market data can inform organizations about talent supply in different locations and provide critical market intelligence on issues like competitiveness, and salary putting data analytic in HR should take the insights gained through workforce analytics initiatives and develop a workforce plan to fill the gaps between current and future hiring needs.

Forecasting workforce provides the basis for efficient, agile workforce scheduling. Only by means of professional workforce forecasting, it is possible to predict which employees with what qualifications are to be deployed where, when and at what cost — calculated per day, per hour or ideally down to the minute. Here, modern and dynamic companies follow the just-in-time principle that offers economic benefits in a whole range of areas – not just production and logistics. After all, the following ultimately is true of efficient workforce deployment:

if staffs are deployed when they are needed, it means less expensive downtime and less overtime. At the same time, there is an increase in productivity and service quality.

Personnel requirements arise directly from specific business processes and objectives. Reliable forecasting workforce is therefore only possible if all demand drivers relevant to the sector and company are taken into account. Requirements vary greatly depending on the sector and company. Personnel demand can also be subject to demand-driven or seasonal fluctuations. In-depth sector know-how is a basic prerequisite of any high-quality workforce forecasting system that aims to provide maximum accuracy. Work force forecasting helps to predict the company's work load so they can ensure they have the correct amount of staff at the necessary time to handle the amount of work, whether that be for day-to-day operations or unusual situations. Although the process can be complicated, it will help deliver both long- and short-term business goals.

According to Barak (2020), fluctuations in personnel requirements are part of everyday business life, whether on a monthly, weekly, daily or hourly basis – or even by the minute. The task of professional workforce scheduling is to offset the effects of such fluctuations in a way that optimizes costs over the short and long term. Starting with estimates of future workload and historical data such as sales achieved, cash desk receipts, order volumes, occupancy rates in hospitals or calls received at call centers, the work force forecasting tool generates a forecast. The relevant information is fed into the forecasting process from upstream systems. The aim was to accurately describe the requirement within a defined period that is as short as possible. This work force forecast then forms the basis for demand-optimized workforce planning down to the nearest minute. By systematically juxtaposing the forecast work load and the actual hours worked, the quality of the forecast – and therefore work force scheduling – can be successively improved. The general rule is that the more detailed and more exact the work force scheduling, the more impressive the effects in practice.

Furthermore, there are guidelines in forecasting work force to implement a proactive approach successfully. An organization will need to complete the steps identified in the next paragraphs. Accuracy is essential to avoid adverse impacts such as future layoffs or hasty hires. It is important to note that organizations should expand or modify these steps to meet the specific needs of their business.

The first guideline is to define the company's business objectives, including its vision, mission, goals, and motives. Once established, HR will need to develop a strategy that aligns with those objectives. In addition, the department will need to define core competencies and requirements that will move the company forward. The company's direction must be communicated to all employees, regardless of position or rank. It is often challenging to connect financial planning and human resources to a workforce forecast and set a budget without reliable, consistent data, utilizing HR analytics will help the department overcome challenges.

The second guideline is to identify the characteristics, capabilities, and distribution of the current labor force, which



will permit the formation of successful gap-closing strategies. An ideal method to gather this data is through HR analytics, which is considered important or very important by 84% of the respondents to the 2018 Deloitte Global Human Capital Trends Survey. To do so, it is best to create a data base with a variety of information such as employee demographics, turnover and recruitment rates, changes within the company that could influence business processes like budgets cuts or change in business direction, competencies of the current work force including permanent, supplemental, and contract employees, employee rewards system and competitor's workforce management strategy.

The third guideline is focused on determining well-defined labor force requirements for future employees. Analyzing internal and external factors that influence business processes is one of the most useful methods of identifying future talent needs for your company. Several questions that can help HR professionals recognize current workforce shortages and predict future necessities include: How can existing skills fill the shortages, How to reduce current turnover rates? What competencies will the company need to meet the business objectives? Will future hires be full or part-time, permanent, or temporary? Where will the labor force be located? What rewards system will be used? And how will the company rank with competitors. While the last guideline focuses on revealing workforce gaps between the current labor force and your future forecast. Common weaknesses to be identified, include business objectives, skill shortages, staffing processes, turnover rates and employee profiles.

The final step is the creation of a gap-closing strategy that will reduce or eliminate the workforce discrepancies discovered in Step Four. The goals of an effective gap-closing strategy are to increase employees' capability and productivity. To help you develop and implement your gap-closing strategy, you should refer to your collected data. Depending on the workforce management goals, the gap-closing strategy can address a variety of business processes such as talent retention and recruitment, employee development, staff reduction and salary projections.

#### *D. Communication Process in Human Resources Department and Employees*

Etukudo (2019) presumed that work place communication is arguably, the most important factor in employee motivation, productivity, and retention. Workplace communication creates the company culture, generates or mitigates conflicts, and sets the tone and pace for what is accepted and expected. HRIS software can be instrumental in fostering better workplace communication, but there are many other factors that must also be taken into consideration. The data that HR collects are invaluable fuel for a company. Those numbers power data-driven decision-making that helps a company's leaders empower the employees. From better training to higher retention of the best performers, HR data make the employees more efficient and effective to their jobs.

An effective communication in the work place is essential to the smooth functioning of the company. Without it, employees

may not be sure what they're expected to do. Managers will be disappointed when expectations aren't met. But what are some ways to improve communication at work, including using of data analytics in human resources information system. Catering to different communication styles do not work the same way or learns the same way. It only makes sense that not everyone would communicate the same way, either. Some people may prefer in-person communication. Others might prefer a text messaging app like Slack or Google Hangouts. Others might prefer e-mail. It is important to meet everyone at their preferred communication style. Managers can learn through observation how each member of their team communicates. If it is hard to tell for some employees, managers can ask them directly.

Establishing trust with employees, would be very difficult if they can't trust their manager. Managers should demonstrate to their employees that they can be trusted. If they make promises, they should keep them. Managers when lie or take credit for employees' work very quickly destroy any trust that existed and along with it good communication. Actively listen because listening skills are just as important as speaking skills. In fact, truly effective communication involves both. It is essential to hear what someone is saying and really listen to understand. If necessary, ask questions! This can help ensure that everyone understands and is on the same page.

Active listening is an important skill for everyone, but especially for those who manage other employees. Asking feedback from the employees is not enough because they aren't the only ones who should be receiving feedback. Managers should also seek feedback from the staff members. Asking for constructive feedback is a great way to improve communication. Sharing constructive feedback offers opportunities to really get to the heart of a problem or a challenge. Put into how feedback is presented, feedback, whether positive or negative, is important to consider how it's presented. If a manager is tone-deaf or aggressive, that can immediately destroy any trust and goodwill they'd built up with the employee. Consider how the feedback is delivered. If it's negative, then focus specifically on the behavior that needs correction. Attacking the person's character isn't constructive, for example. The same goes for compliments. Positive feedback can seem false or disingenuous if not delivered the right way. Managers delivering compliments should be specific about what they're praising. Employees need to know specifically what they're doing well just as much as they need to know what they can improve.

Although, HR can allow anonymous feedback, sometimes there are subjects that employees aren't comfortable reporting. Allowing a forum for anonymous feedback can help ease their fears. Managers can more easily uncover hidden problems that are preventing their team from meeting their full potential. A HRIS may have tools for anonymous feedback in an employee self-service portal. Nevertheless, using the right tool for the right conversation is crucial because there's a time and a place for everything. This applies to workplace communication, too. While chat tools like Slack are convenient, they're not always the best way to communicate. If there's a chance for

misunderstandings or miscommunication, it's time to speak in-person. It's difficult to construe tone via chat or email. An in-person discussion can help clear up any possible misunderstandings.

HRIS can provide many useful tools that can aid in improving workplace communication. However, it is important to ensure using those tools correctly to best improve communication. Messaging options are common features of HRIS software. But there are times when in-person communication may be better. In cases like these, managers can choose to use video communication software to communicate. When messaging options are available through HRIS, employees and managers may communicate and collaborate using their own devices from wherever is convenient. This opens new avenues for communication and allows employees to address concerns that they may not have felt comfortable addressing at work or that they may have rushed through. This can create an "open-door policy" and ease some of the tension surrounding communication.

The time-off request options and the ability to request changes to personal information are simplified means of communication that can cut out more involved communications that may not be necessary. When managers and HR professionals can respond to these changes using the HR system, they can save time and hassle. The same results can often be achieved, as well. However, for global workforces, HRIS messaging options can help to bridge spatial gaps and create more cohesive and collaborative teams. Employees may be able to think outside the box when tackling issues with employees that do the same job but have different cultural backgrounds. Messaging may also help to sidestep language barriers by offering translation options.

#### *E. Other Related Review of Literature*

Ohri (2021) stated that the human resource management information system (HRIS) is generally a software program or an online solution that can help in everyday tasks of human resource employees, including data tracking, data entry, and data management. In the past decade of growth and innovation, human resources have evolved a lot. One such development is the introduction of the human resource management information system (HRIS). There are many useful human resources applications, such as payroll calculation and processing, application tracking, work schedules, time management, employees' self-regulation and service, performance management, database management, and use of mobile phones only to manage huge workplaces.

The systems and working components are critical to run the wheels of an effective and efficient approach to human resources and their advancement. Let's explore these models in the following list:

First is the Input and Output model. This model is actually based on the basic input and output functioning of an HRIS. So, to understand this model, one has to follow a modular approach. The first and foremost thing to take care of is the Input Subsystems, including Internal and Environmental Sources that provide data for the system to operate on. These data are fed

into sub-processes that include data processing subsystems, human resources research subsystems, and human resources intelligent subsystems. The processed data are then fed into the HRIS database which is then pushed into the other module known as output subsystems, including subsystems such as the workforce planning subsystem, recruiting subsystem, workforce management subsystem, compensation subsystem, and benefits subsystem.

Second is the HRIS adoption model. With the evolving market, the number of HRIS models in the market are extremely high, and choosing the one that ensures the organization of the perfect architecture is utterly important, and hence, taking the right decision is extremely important. There are many dimensions that an organization should consider before they make any stance on HRIS Adoption. These include the human dimension -the level of the innovation of the employees and the senior management, along with the capabilities of the IT staff, defines this dimension. This helps in defining the scope of the implementation of the HRIS system. The technological dimension caters to the new innovations and technologies, such as a robust IT Infrastructure, true compatibility, and complexity of domains should be minimal, to be able to pursue the adoption effectively. Organizational dimension deals with the concept of relative advantage, top management support, centralization of resources, formalization, and cost management. These factors play an important role in HRIS selection and adoption. Environmental Dimension is fueled by competitive pressure from other organizations, technology vendor support, government regulations, and support from like-minded personalities. The HRIS success model, the user expects something extraordinary from the organization regarding user response, quality of the systems processes and services. Many factors are responsible for user satisfaction, including system quality, information quality, ease of use, and usefulness. The HRIS process and working components were created by the inflow of new-age technologies and rapid digitization of basic data collection techniques, along with the rapid increase in employee count in companies. Thus, the use of human resources information systems plays an important role in formalizing the data effectively and economically. This would increase the effective workflow and improve efficiency. Various components should be taken care of while adopting an HRIS model. The Management of database which is the storage and management of all information should be done in an effective environment and should be managed with the best resources available. This should be done so that the HR team can easily store and manage the data in the system to be accessed from any part of the globe anytime. The data stored can be of various types such as payroll calculation and processing, application tracking, work schedules, and time management, employees' self-regulation and service, performance management, and database management.

Nowadays, we can't monitor the work of individual employees every day and hence the need for a self-monitoring system which can detect the pattern of work done by employees and the time needed and dedicated for a specific project. The introduction of biometrics and agile framework, the effective

management of resources can be easily calculated and examined Payroll and benefits management and management and the distribution of payroll are among the most important functions of HR. The use of the HRIS helps remove the human error along with seamless benefits management of employees such as medical and retirement benefits. The important thing for an organization is to solve the employees' problems, and a dedicated interface for employees can sort this problem. The acquisition and retention of employees depend on the availability of extensive support and available features.

There are advantages of the Human Resource Management Information System. More transparency leads to a more honest and engaging employee experience. Data storage can be done in a secure in-house environment to avoid cyber-attacks and identity theft. Retrieving and analyzing data can be a lot easier using a dedicated HRIS System. Duplication of resources and capital can be avoided and this provides an improved quality assurance of reports.

The adaptability of the organization increases because of the access to the right information, and the increased awareness of both the internal and external environment. There is on-demand availability of the data anytime and anywhere in the world.

Data analytics is the process of analyzing raw data to find trends and answer questions; it captures its broad scope of the field. However, it includes many techniques with many different goals. Stedman (2021) said there are four primary types of data analytics, and these are the descriptive, diagnostic, predictive and prescriptive analytics. Each type has a different goal and a different place in the data analysis process, which are also the primary data analytics applications in business.

Stedman (2021) reiterated that application of data analytics in the Human Resources Information System are broad. Analyzing the big data can optimize efficiency in many different industries. It will help human resources understand the engagement levels better. Kinley (2016) said that the success of any company is directly related to the its people and 43% say that investing in people is a majority priority. Eventually, data analytics looks to be the new hero in HRIS respectively in the recruitment of applicants, forecasting workforce and the communication process between HR and the employees.

According to Dyson (2019), workforce forecasting in HR analytics have become a key focus point for HR professionals around the world, as they confront new challenges in finding and retaining the right employees. As technology advancements, HR systems are bringing in more data and key insights into the dynamics of workplaces. Workforce forecasting is becoming an essential business process for companies of all sizes. Many companies struggle with this process as it involves aligning talent management with business objectives, so that a company can meet its regulatory, service and production requirements. It is a finance-led process for a great majority of companies, focused primarily on managing headcount to budget to ensure there are no cost overruns. The standard procedure is that average cost-per-headcount allocations are made, and hiring is closely monitored. Collecting essential data points is a key step in a data-driven HR program. However, Etukudo (2019) presumed that

workplace communication is arguably the most important factor in employee motivation, productivity, and retention. Workplace communication creates the company culture, generates or mitigates conflicts, and sets the tone and pace for what is accepted and expected. HRIS software can be instrumental in fostering better workplace communication, but there are many other factors that must also be taken into consideration. The data that HR collects is invaluable fuel for a company. Those numbers power data-driven decision-making that helps a company's leaders empower their employees. From better training to higher retention of the best performers, HR data make the employees more efficient and effective at their jobs. HRIS can provide many useful tools that can aid in improving workplace communication. However, it's important to ensure that using those tools correctly to best will improve the communication. Finally, there is an exceptionally large number of HRIS, HRMS, or HCM (Human Capital Management) solutions available in the market. The organization should invest more in these systems to compete in future scenarios. There are various types of HRIS systems available for purchase, which may offer many functionalities. A company or organization can choose to develop itself and reap the best benefits in the long run. Therefore, data analysis has come a long way; however, even though the most advanced analytics still lacks contextual knowledge. An analysis is not understand and when its conclusions are not what a human mind intended, preferred, or even find acceptable. Data provide insights, but only humans can provide context and action. So if an organization wants to improve its communication with its employees, it should leverage data with a human touch.

### 3. Research Methodology

This section presents the method of research used and the variables of the study, population and sampling, research instrument, data gathering procedures and the statistical tool used in interpreting the data for this study.

#### A. Research Method Used

The researcher used the descriptive method, particularly the quantitative approach, descriptive study is one of the best methods for collecting information that can demonstrate relationships between variables. It can describe what usually exist, such as current condition, practice, situations of any phenomena. The descriptive method involves the collection of data in order to test a hypothesis or to answer questions concerning the subject of the study, (Dudovskiy, 2016). A quantitative approach is the process of collecting and analyzing numerical data. It is used to test or confirm theories and assumptions of the establish generalizable facts. It gathers quantifiable information that can be used for statistical inference on the target audience through data analysis.

This study involved the distribution of a questionnaire to the management committee a chosen IT company to determine the applications of data analytics in its Human Resources Information System. Copies of the questionnaire are sent and received through online and by appointment because of the Covid -19 pandemic. Data collected tested the hypothesis and

answered the questions of the statement of the problem. This aimed to provide a description of differences among the variable, profile of the company, and all relevant data that contribute to the applications of data analytics in human resources information system.

Triangulation is a method used to increase the credibility and validity of research findings. Credibility refers to trustworthiness and how believable a study is; validity is concerned with the extent to which a study accurately reflects or evaluates the concept or ideas being investigated. Triangulation enriches research as it offers a variety of data sets to explain differing aspects of a phenomenon of interest. It helps refute where one data set invalidates a supposition generated by another. It can assist the confirming of a hypothesis where one set of findings confirms another set (Heale & Forbes, 2013).

### *B. Population Frame and Sampling Scheme*

This survey covered private IT services companies in Metro Manila. The researcher selected three (3) cities and five (5) IT companies which are located in Makati City, Pasig City and Quezon City. Each company is represented by five (5) management committee members, with a total of seventy-five (75) respondents to complete this study.

This study used the purposive sampling method. The researcher used her own judgment for the study for choosing the members of the population who participated in it. As utilized in a quantitative method of research, purposive sampling involves alternative process of selecting research subjects rather than starting with a predetermined sampling frame.

### *C. Description of Respondents*

The selection process involves criteria based on position, skills, experience and knowledge of respondents on data analytics relative to the study and this includes the profile of the company in terms of asset size, number of employees, period of operations and type of company services. The respondents are the members of the management committee with two (2) years and above work experience in the selected IT companies in Metro Manila. They are the ones who had enough knowledge to answer the problems posed in the study because they have the knowledge and skills about data analytics in HRIS. They answered the questionnaire with the information needed. Members of the committee include the head of human resources, head of finance, general manager, administrative officer and the technical head.

The Researcher believed that the chosen respondents are the preeminent employees to interview about the company process in relation to the applications of data analytics in human resources information system.

### *D. Research Instruments Used*

The research instrument is a researcher-made questionnaire designed for the study and validated by IT and HR experts. During the validation process, copies of the questionnaire were given to IT and HR experts who went through the research questions carefully to ascertain the appropriateness and adequacy of the instrument. The experts suggested structuring

the questionnaire in the Likert fashion, on a four-point scale instead of the Five –point Likert fashion.

After the validation of the questionnaire, a pilot testing was carried out on the instrument to respondents who were not part of the actual respondents in the actual research carried out, and this was done in order to see how the subjects reacted to the questionnaire: whether the items are clear enough and easily understood, whether there is the need to include more items in certain areas, whether there are some items to which they would not like to respond, and to determine the workability of the proposed method of data analysis for the study.

The questionnaire was designed on the Applications of Data Analytics in Human Resources Information System, based on statement of the problem to determine the important data. The researcher formulated a seven (7) part questionnaire to be answered.

Part I comprises the company profile based on the following: asset size, number of employees, period of operation and the type of company services. Part II relates to the Data Analytics in Human Resources Information use in terms of recruitments of applicants. Part III is associated with the use of Data Analytics in Human Resources Information system in forecasting workforce. Part IV covers the use of data analytics in the communication process between human resources department and employees. Part V is on the relationship between the recruitment of applicants and forecasting the workforce.

The results of the survey were tallied and tabulated on Scale, Range, and Verbal Interpretation.

Scale	Range	Verbal Interpretation
4	3.50 – 4.00	Strongly Agree
3	2.50- 3.49	Agree
2	1.50 – 2.49	Disagree
1	1.00 - 1.49	Strongly Disagree

### *E. Data Gathering Procedures*

In order to facilitate the process of data collection, the researcher requested a letter from the Graduate School to conduct a study and distribute a questionnaire in the selected companies in Metro Manila. The letter requested was reproduced and distributed to the respondents.

Ethics is very necessary of conducting an effective and meaningful research study. In order to ensure this, proper ethics was observed during the data gathering process, especially the observation of precautions during this time of pandemic. Respondents were properly informed of the purpose of the study and were assured that confidentiality and anonymity will be maintained. Copies of the questionnaire were distributed to the respondents with the permission of the General Manager of the Company and personally administered and collected by the researcher.

### *F. Statistical Treatment of Data*

The following statistical tools were used in treating the data:

1) Weighted mean was used for determining the respondents assessment on the recruitments of the applicants, forecasting

workforce, communication process between HR department and employees and the issues and challenges of data analytics in human resources information which would help to obtain the application of Data Analytics in Human Resources Information System. Everitt & Skrondal (2 010) defined the formula for weighted mean as:

$$\bar{x} = \sum x_i \frac{W}{W_i}$$

Where:

- $\bar{x}$  = Weighted mean
- $x_i$  = Stands for weights
- $W_i$  = No. of values

2) Chi-square test is a hypothesis testing method. The test is applied when two categorical variables from a single population. It is used to determine whether there is a significant association between the two variables. Two common Chi-square tests involve checking if observed frequencies in one or more categories match expected frequencies. For the purpose of this study, two measurement variables were used: the test of independence which involves variables that divide the data into categories and decide if two variables might be related or not. (JMP statistical discovery from SAS).

The statement of the problem asks, if there is a relationship between recruitment of applicants and the forecasting of workforce.

Formula for Chi-square test:

$$\chi^2 = \sum \frac{(O - E)^2}{E}$$

Where:

- $\chi^2$  = the chi-square
- O = observed frequencies
- E = expected frequencies

#### 4. Presentation, Analysis and Interpretation of Data

This section presents the results, analysis, and interpretation of data. The data gathered was represented in tabular and textual form with the aid of statistical treatment for analysis and interpretation. The data were examined, analyzed, and organized based on the statement of the problems in Chapter 1. This chapter presents and elaborates the details of the total 75 respondents who participated the survey. These respondents came from different management committees of selected private IT services companies in Metro Manila.

##### A. Company Profile

The following tables illustrate the company profile, company asset size, number of employees, period of operations and the type of company services.

###### 1) Asset Size

Table 1 enumerates the company profile according to the asset size of the respondent.

Table 1  
Company profile according to asset size

Asset of the Group	Frequency	Percentage
less than ₱5 million	3	20.00
₱5 million - ₱10 million	1	6.67
₱11 million – ₱15million above	10	66.67
₱2 billion	1	6.66
<b>Total</b>	<b>15</b>	<b>100%</b>

Table1 shows that most of the companies have the asset size of ₱11million to ₱15 million, which comprises 66.67% or 10 of the total number of the companies. This shows that most of the IT services companies operate with the capital of ₱11 million to ₱15 million but not above ₱2 billion. This is followed by the asset size group ranging from to

Less than ₱5 million with 3 respondents out of 15 or 20% of the total. The asset size group of ₱5 million to ₱10 million and ₱2 billion both took up 1 respondent or 6. 66% of the total.

###### 2) Number of Employees

Table 2  
Company profile according to number of employees

Total Number of Employees	Frequency	Percentage
Less than 50	2	13.33
51-100	3	20.00
101 - 150	8	53.34
151 and above	2	13.33
<b>Total</b>	<b>15</b>	<b>100%</b>

Table 2 shows that most of the IT services companies in Metro Manila have 101-150 employees, which made up 8 frequencies or 53.33% of the total respondents, followed by 51-100 employees with 3 or 20% of the overall respondent. Lastly, it shows in the table also that less than 50 employees and 151 and above employees in IT services companies in Metro Manila both took 2 or 13.33% of the total respondents.

###### 3) Period of Operations

Table 3  
Company profile according to period of operations

Period of Operations	Frequency	Percent
less than 5 years	1	6.67
5 years to 10 years	4	26.67
11 years to 15 years	5	33.33
More than 15 years	5	33.33
<b>Total</b>	<b>15</b>	<b>100%</b>

Table 3 displays that most of the companies operated for 11 to 15 years and above. Composed of 5 respondents or 33.33% of the total. For 5 years -10 years of operations, 4 respondents or 26. 67% got share of the total and followed by less than 5 years of service with only 1 respondent or 6.67% of the total.

###### 4) Company Services

Table 4  
Company profile according to company services

Services	Frequency	Percentage
Back -up	1	6.67
IT Infrastructure	1	6.67
IT Solutions	3	20.00
Infra	2	13.33
Managed service	5	33.33
Platform Service	1	6.67
Software development	2	13.33
<b>Total</b>	<b>15</b>	<b>100%</b>

Table 4 shows that most of the companies’ principal activity is Managed Service, which made up 5 or 33.33% of the respondents, followed by 3 respondents or 20% of the companies have a principal activity of IT Solutions. Infra and Software Development, both took up 2 respondents or 13.33% of the 15. Lastly, the companies whose principal solutions are Back-up, IT Infrastructure, and Platform Service, all took up 1 frequency or 6.67% of the total respondents.

*B. Data Analytics Use in the Human Resources Information System for the Recruitment of the Applicants*

Table 5 shows the assessment of the respondents about how Data Analytics is used in the Human Resources Information System in terms of recruitment of the applicants.

Table 5 shows that the over-all rating is 3.32, which means that application of data analytics in HRIS in terms of recruitment of applicants is verbally interpreted as agree.

As to its purpose, the table also shows that the respondents gave the highest assessment on the application of data analytics for recruitments of applicants is beneficial to human resource department with weighted mean of 3.53 which means respondents is strongly agree. This is followed by Data analytics in HRIS aid to reduce recruitment cost and expenses with weighted mean of 3.57 with verbal interpretation of strongly agree. Finally, the table also shows that application of data analytics in HRIS eliminates unsuitable applicants, focus on best candidates, provides real time to hire faster, gather performance data of the employee and streamline the recruitment strategies got the same verbal interpretation of Agree.

According to Kinley (2016), the success of any company is

directly related to its people. In fact, 71 percent of CEOs view human capital as the top factor for sustainable economic value, according to a report by Harvard Business Review, with 43 percent saying that investing in people is a major priority. It’s no wonder then that employers and recruiters are continually improving their methods of finding, hiring and retaining top candidates. Data analytics can provide hiring managers with predictive power and more accurate insight into candidates’ skills and their suitability to companies and roles. It can also point them to where the best candidates are located.

Analysing data within this framework means candidates can be assessed at each stage in relation to where they were sourced from, so hiring managers can “identify higher performing channels, and the stages in the funnel that are filtering too aggressively.

*C. Data Analytics Use in Forecasting Workforce*

Table 6 presents the assessment of the respondents about Data Analytics use in in forecasting workforce.

As can be seen in Table 6, the over-all mean is 2.77 which shows that the respondents agree on the use of data analytics in HRIS in forecasting workforce. On the first statement, the data revealed that the respondents assess that they agree for Predicts employees’ qualifications that are to be deployed where, when and at what cost calculated per day and per hour with rating of 3.76 with verbal interpretation of agree. The second highest rating is application of forecasting workforce evaluates redundant employees with weighted mean of 3.37 and verbal interpretation of strongly agree. The third highest rating revealed that respondents assess forecasting workforce Improve management decisions in achieving company goals with weighted mean of 3.34 and verbal interpretation of agree, this

Table 5  
Data analytics use in recruitments of applicants

Factors	Weighted Mean	Verbal Interpretation
Applications of Data Analytics for recruitments of applicants is beneficial to Human Resources Department.	3.53	Strongly Agree
Application of Data Analytics in HRIS aid to reduce recruitment cost and expenses.	3.57	Strongly Agree
Data Analytics eliminates unsuitable applicants	3.42	Agree
Data Analytics focuses on best candidates	3.31	Agree
Data analytics provides real time to hire faster	3.13	Agree
Data analytics gathers performance data of the employees	3.16	Agree
Streamline the recruitment strategies	3.14	Agree
<b>Overall Weighted Mean</b>	<b>3.32</b>	<b>Agree</b>

Table 6  
Data analytics use in forecasting workforce

Factors	Weighted Mean	Verbal Interpretation
Predicts employees’ qualifications that are to be deployed where, when and at what cost calculated per day and per hour	3.76	Strongly Agree
Gauged employees’ absenteeism per month and per year	2.80	Agree
Gauge employee’s tiredness per week, per month and per year	2.95	Agree
Estimates HR requirements for staffing skills set	2.56	Agree
Projects employee’s promotion and demotion	2.63	Agree
Reduces employee’s turnover	2.68	Agree
Improves management decisions in achieving company goals	3.34	Agree
Improve the accuracy of HR planning and strategies.	3.18	Agree
Analyze the talent Competencies of the current workforce including permanent, supplemental, and contract employees	2.59	Agree
Improves competencies on current workforce rewards system	3.32	Agree
Retains the HR Talent Retention	3.0	Agree
Strengthens employee training and development	3.24	Agree
Evaluates redundant position	3.37	Agree
<b>Overall Weighted Mean</b>	<b>2.77</b>	<b>Agree</b>

is same to forecasting of workforce Improve the accuracy of HR planning and strategies with weighted mean of 3.18 with verbal interpretation of agree. Finally, forecasting workforce estimates HR requirements for staffing skills set got the lowest weighted mean of 2.56 with verbal interpretation of agree.

According to Dyson (2019), workforce forecasting is becoming an essential business process for companies of all sizes. Many companies struggle with this process, as it involves aligning talent management with business objectives, so that a company can meet its regulatory, service and production requirements. However, Wiblen, Grant and Dery (2010) mentioned that forecasting process can aid the organization in many ways, including understanding the workforce across of the organization, reduce the possible risk of staffing shortages, examine current staffing skill sets to compare with the future needs, determine new organizational structures for better workforce deployment in the future, streamline recruitment strategy, improve business decisions and achieve company goals.

*D. The Relationship Between the Recruitment of Applicants and Forecasting of the Workforce*

Table 7 shows the relationship between recruitment of applicants & forecasting of workforce.

Since the p-value exceeds 0.05 significance level, there is no sufficient evidence to claim that there is a significant relationship between forecasting of workforce and recruitment of applicants. therefore, application of data analytics in HRIS in recruitment of applicants and forecasting of workforce have their own character without being dependent to each other. The null hypothesis is accepted.

*E. The Use of Data Analytics Communications Process Between the Human Resources Department and Employees*

Table 8 illustrate the data analytics in communication process between the human resources department and the employees

As can be seen in Table 8, the overall weighted mean is 3.32 which shows that a significant number of employees agree on use of data analytics in communication process between HR department and employees. Use of data analytics in HRIS on accuracy of employees' data base got the highest weighted mean of 3.50 with verbal interpretation of strongly agree, and data analytics aid to initiate integrity in the workplace is the lowest weighted mean of 3.16 with verbal interpretation of

agree.

According to Weber (2017), communication plays a key role in a relationship. Communication is used in human resources to relay information from directors to employees. This information pertains to company policies or goals. Effective communication increases productivity, which benefits employees and the company and proper communication techniques can boost employee morale to create a positive work atmosphere. HR leaders can evaluate every potential and current employee's communication skills and provide each with personalized improvement recommendations and learning resources. And aggregate, program-level analytics to help leaders identify common challenges among teams and throughout the organization. This will help to fill the gap between employees and their supervisors.

*F. Proposed Data Analytics Model to be used by the IT Companies*

*1) HRIS Model*

The results of the study were analyzed and the researcher suggested the benefits of data analytics in Human Resources Information System model based on the outcome.

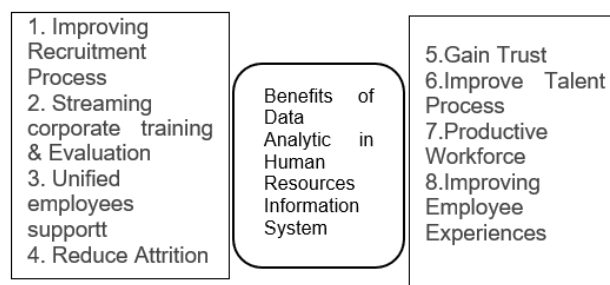


Fig. 2. HRIS model

Data Analytics in Human Resources Information System model will help the organization to improve its strategies tackle the current issues and prepare for the future activities. Some of the benefits that data analytics in HRIS offers are as follows:

1. Improving the recruitment process. Talent acquisition is a key element of the recruitment; it is a yearlong activity. It could be a new function, replacement or to have bigger team. Finding the right candidates is a stressful task especially when need to on-board a candidate immediately. This emphasizes how many candidates need to reach out to close a position or how

Table 7

The relationship between recruitment of applicants and forecasting of the workforce

Application of data analytics	Sum of Square	Level of Significance	P- Value	Significance
Recruitment of applicants	38	0.05		
Forecasting workforce	29	0.05	0.909	Relationship is not significant

Table 8

Data analytics in communication process between human resources department and employees

Factors	Weighted Mean	Verbal Interpretation
Strengthen the communication of employees and HR department	3.34	Agree
Accuracy of employees' data base	3.50	Strong Agree
Employees well informed about their work group's plans and progress.	2.59	Agree
E filling of employees leave of absence aid the accuracy of leave management	3.38	Agree
Simplify employees request on HR matter	3.27	Agree
Data Analytics aid to initiate integrity in the workplace	3.16	Agree
<b>Overall Weighted Mean</b>	<b>3.30</b>	<b>Agree</b>

- many candidates actually join. These are just some issues that could look at resolving problems through data analytics in HRIS. This will help the organization see the bigger picture and fill in whatever gaps that are causing delays of the process.
2. Streamlining corporate training and evaluations. By using data analytics in HRIS analytics, trainers can devise new strategies to modify courses and make employees more productive.
  3. Unified employee support. By making use of data analytics in HRIS, an organization can identify a resource that accepts employee requests and returns the relevant information. This not only saves everyone time but also unifies the approach.
  4. Reduce attrition. Employee retention is becoming harder every day, especially with the younger generations work force who were not afraid of switching jobs frequently. Conduct exit interviews, gather data, look at the reasons, patterns and find a way to arrest the attrition rate. Data Analytics in HRIS will go a long way in identifying what are the factors contributing to attrition and what remedial measures can be taken to avoid it in the future.
  5. Productive workforce. Productivity levels will always go up and down and there are a host of factors affecting performance. This ranges from office infrastructure, work environment, managers and team-mates, and job satisfaction among other things. Gathering data on what's affecting productivity will certainly arm you with data to take corrective actions. Employee engagement is a key factor affecting workforce productivity. Look at improving engagement. You can start off by implementing a few employee engagement ideas and activities to boost the rate.
  6. Gain employee trust. Data Analytics in HRIS will let you access data that let you see what's happening in the organization and how employees are perceiving it. When you are armed with data, you be able to will fix what's supposedly broken and improve in the future processes. You can clearly see what's working and what's not. When bring about changes to processes to make them better and introduce new ones, the employees will take notice. They know their feedback is valued and the management team will act on it. This is crucial to build and maintain employee trust, a critical element to high employee engagement, employee success, and employee retention percentages.
  7. Improve employee experience. It is imperative for managers and HR practitioners to meet with employees regularly to understand what factors are affecting employee experiences in positive and negative ways. This is a crucial step in improving employee experience. Many organizations fail to realize that employee experience starts at hiring. The first interaction with a candidate before hiring is

equally important to any other HR-related process. Employee experience is the sum of experiences that an employee feels throughout the journey. Every step, every behavior, and every experience counts. Analyzing how strong an employee's sense of belonging is, as well as what contributes to it with the help of data analytics in HRIS, this can help improve company culture and create a better work environment.

8. Improve talent processes. Improving talent processes is not only about pre-hiring, hiring or annual performance reviews, but it also much more than that. You need to consider training, recreational activities, and counseling among others. While each organization is unique, there are some processes that should be standard, these can be regular one-on-ones, skip-level meetings, etc. HR practitioners should always monitor their talent processes, identify challenges and bottlenecks if any, and then work on them. It's ideal to meet with employees; however, it should be understood that this may not always be possible or feasible. Conducting employee surveys is a good idea. Get their feedback and inputs and work on them, let them know they are being heard. Employee surveys don't always have to only be exit surveys; do it to see what they feel about employee benefits, how employee experience is at your organization, what changes they would like to see for improving it, etc.

Despite such benefits, many companies still assume that data analytics in HRIS deals with gathering data pertaining to employee efficiency and effectivity. The truth however is very different from such naive assumptions. Data analytics in HRIS tools aim to provide insights into each process by gathering data and then using them to make relevant decisions about how to improve the processes. HR analytics does not mean buying expensive software and setting up a huge team or long processes. It can start small, have conversations with employees, record responses, add managers in the loop, involve various functions, make a plan, share it with everybody, and commit to it. Sharing the data is crucial to make sure that all, know them understand them, and suggest ideas to improve the employee experience. Use the data to drive initiatives, remedy any existing problems, and bring positive changes in the organization.

## 5. Summary, Conclusions and Recommendations

This section presents the summary of findings, conclusions and recommendations derived in the conduct of the study to probe the Application of Data Analytics in Human Resources Management System.

The study was conducted on selected Private Information Technology (IT) services companies in Metro Manila. The respondents were the five management committee members of the five selected companies in Makati City, Pasig City and Quezon City. This study answered the research questions pertaining to the Respondent Company Profile on asset size, number of employees, period of operations and types of



company services; Data Analytics use in Human Resources Information System for Recruitments of Applicants; Data Analytics use in Forecasting Workforce; Data Analytics use in Communication Process between HR department and Employees; The relationship of recruitments of applicants and forecasting workforce; and the recommendations.

The following observations was drawn from the result of the questionnaires and interview:

#### 1) *Company Profile*

Majority or most of the IT services companies have more than ₱15 million in asset size; in terms of number of employees, respondents revealed that most companies have more than 101 – 150 employees; it also reveals most companies are already operating from 10 years up to more than 15 years, furthermore, majority of the IT company services are on managed services which shows 33.33% of the total.

#### 2) *Data Analytics Use in the Human Resources Information System in the Recruitment of the Applicant*

The overall assessment of the respondents about Data Analytics use in the Human Resources Information System in terms of the recruitment of the applicants is “strongly agree” with a range of 3.53 weighted mean. The respondents also clearly stated that Application of Data Analytics in HRIS aid to reduce recruitment cost and expenses has weighted mean of 3.57 with verbal interpretation of strongly agree. The overall weighted mean is 3.32 with verbal interpretation of agree.

#### 3) *Data Analytics Use in Forecasting Workforce*

The respondents show that Data Analytics in forecasting workforce, overall assessment is 2.77 weighted mean with verbal interpretation of “agree “. Obviously, most respondents failed to agree, but data analytics in Predicts employees’ qualifications that are to be deployed where, when and at what cost calculated per day and per hour got a 3.76 weighted mean with verbal interpretation of “strongly agree”.

#### 4) *The Relationship Between Recruitment of Applicants and Forecasting*

There is no significant relationship between the recruitment of applicants and the forecasting of workforce.

#### 5) *Use of Data Analytics Communications Process Between the Human Resources Department and the Employees*

Results show that the over-all rating of the use of data analytics in communication process between HR department and employees is 3.30 in weighted mean with verbal interpretation of “agree”. Accuracy of employee’s data base got the verbal interpretation of strongly agree with weighted mean of 3.50.

#### 6) *The Data Analytics Model Proposed to be used by the IT Companies*

The results of the study were analyzed and the researcher suggested seven (7) benefits of data analytics in Human Resources Information System model based on the outcome. This model may help the organization to improve the strategies in preparation for future activities.

### A. *Conclusions*

Based on the indicated findings, the following conclusions were drawn;

1. Each company has more than ₱10 million asset size,

more than a 100 employees, not less than 11 years period of operation and managed services type of company services.

2. Application of data analytics in Human Resources Information System in Recruitment of applicants is beneficial to the human resources.
3. The use of data analytics in forecasting the workforce in the human resources information system predicts employees’ qualifications, evaluates redundant positions and improves management decisions.
4. There is no significant relationship between recruitment of applicants and forecasting workforce.
5. The use of data analytics fortifies the communication process between HR department and employees.

### B. *Recommendations*

Based on the conclusions, the following recommendations are suggested:

1. Companies may consider to administer data analytics in the human resources information system regardless of the company profile. This can help the organizations to improve the processes and procedures of the recruitment process, it will positively reduce the cost and expenses for recruitments.
2. The HR practitioners may save their time to recruit and be more effective and efficient to achieve the common goal of the company. It may satisfy the human resources strategies on the accuracy of forecasting workforce to estimates the future requirements of the organizations.
3. The management committees may help to ease formulate the plan and path to keep the company from making the same mistakes. Data Analytics will assist the management to make educated decisions on the evidences rather than on the management decision base. With this it will help improve employees’ performance behavior and accuracy of doing their assigned tasks.
4. Future researchers may conduct other studies related to this research to confirm its findings.

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