Effect of Big Data and Analytics on Managing Projects

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Abstract

The rapid pace of technological advancement necessitates constant adaptation. As a rapidly evolving field, project management has little choice but to take use of technological breakthroughs to stay relevant and fresh. Using big data analytics, businesses and project managers alike can reap the benefits of this technology. Big data analytics is definitely useful for influencing the future of project management, as outlined in this article's preliminary comments. A new era of 21st-century living appears to be upon us, and project management as a profession appears to be ready to embrace it. Big data collects and stores enormous amounts of data that are becoming increasingly difficult to manage and analyze. The potential benefits and competitive edge of this new technology are motivating the majority of businesses to invest in big data analytics. Structured or unstructured, large amounts of heterogeneous data are processed and managed as "Big Data" in the enterprise. This includes both structured and unstructured data. Analytic methods and technologies are heavily employed in the management and analysis of large and complex data sets for use in a wide range of applications that enhance the performance of a business. This paper analyzes the impact of big data and business analysis on project management. A literature review is followed by primary and secondary data analysis, which includes interviews and surveys for architectural analysis, in an exploratory study. Qualitative and quantitative data are the norm in all studies in this study. The present study is descriptive in nature, as the goal is to examine the impact of big data and business analysis on project management. Below mentioned impacts have been analyzed and concluded that big data analytics helps to reduce the project complexities, reduces the project cost and enhances the project risk management.

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Key Words: Big data; analytics, project management; digital transformation; digital disruption; and disruptive technologies.

1 Introduction

There are a wide range of business analytics skills, technologies and apps that may be used to continuously iteratively explore and investigate previous performance to gain actionable insights. Based on data and statistical approaches, business analytics aims to uncover new insights and better understand business performance. Data sets that are huge, diversified, and fast changing are referred regarded as "big data" by many businesses. System capabilities beyond those of ordinary SQL-based databases are required for handling big data. More than 1.5 million managers and analysts are expected to be needed in the United States to cope with big data analytics [15]. The estimated demand for deep business analytical roles could exceed supply produced by the current trend by 140,000 to 190,000. There is a growing consensus among prominent academics and business leaders that big data and analytical techniques will have a significant impact on our economy and society over the next decade or two [13]. Business analysis and big data are examined to ensure that firms will remain relevant in the future. In addition, the potential for use in a variety of fields is also highlighted.

Big data captures and retains enormous amounts of data that are becoming increasingly difficult to manage and analyze. The potential benefits and competitive edge of this new technology motivate most businesses to invest in big data analytics. Large amounts of data, whether structured or unstructured, that are used in project management can be processed and managed using big data techniques. The administration and analysis of massive volumes of complex data sets for use by numerous applications that improve the operation of a business is significantly reliant on analytical methods and technologies in big data analytics.

As defined by [19], a "project" is a one-time assignment

with a defined start and end date that involves the allocation of resources in order to achieve predefined goals. Project managers are responsible for the sound management necessary for a project's success. Therefore, the initiatives must be assigned to the proper managers. The assignment of a project manager is a crucial project choice that influences the success of the project and the performance of the organization [20]. Stakeholder expectations and needs are met or exceeded through the application of project management knowledge, skills, tools, and technology [11]. Project management is the systematic control of a project that begins with the project planning phase and ends with the project's conclusion

The term "big data" refers to data sets that are larger and more diverse than those typically handled by relational database management systems [22]. The term "big data" refers to data that has a high volume, a high rate of change, and a high variety; it is characterized by the use of new technologies and techniques to acquire and analyze the data; and it enhances decision-making capabilities, and provides more insight, discovery, and support for process optimization [2]. Social media, movies, digital photos, and sensors are just a few of the many places where big data may be found. By utilizing data analytics, a company can gain a competitive edge, improve efficiency, and discover new revenue streams. Data analytics can be used for a variety of purposes, including credit risk assessment, marketing, and detecting fraud [25]. Analytical techniques can be divided into descriptive, predictive, diagnostic and prescriptive analytics [10]. Analyzing large amounts of data with the goal of discovering new patterns and gaining new insights [26]. There are a lot of variables at play when it comes to project management, both inside and externally. When risks become 'Issues', they must be managed in order to minimize their negative impact on the project's outcome. Prudence dictates that project teams identify and manage risks on a continuous basis by taking an active role in doing so. That would necessitate the recording of all risk incidents. Additionally, when risks actually occur and turn into issues, the firefighting and troubleshooting efforts necessary to deal with them are documented thoroughly. This method generates a great deal of data that may be used to better manage risks and difficulties. Assessing risk and issues-related data using big data analytics can lead to new approaches and procedures for discovering, analyzing, prioritizing, monitoring, and establishing risk response strategies. Risk management may not be given the attention it deserves because of this, but in order to make it more widely accepted by those involved in projects and use the newly developed procedures to better address risks and issues. It is imperative that new methods, procedures, and techniques be developed. These goals can be met with the help of big data analytics.

2 Literature Review

The Literature review covers the four elements of digital disruption (Business – Technology – Industry and Society) with

their respective 3 parameters as follows:

2.1 Effect of Business Analysis and Big Data Project Management from Business Side

2.1.1 Market. Marketing campaigns can be tailored to specific client needs thanks to the use of big data. Predicting what clients will require in the future can actually be done with the help of a good analysis. With this information, it is much easier to create customized adverts for certain products. Also, it encourages corporations to pay greater attention to what their customers want. Predicting future trends can be done by collecting and analyzing data regarding client wants. Insights gleaned from big data analytics can be used to create new goods and services for businesses. As a result, they are better able to anticipate the demands of their clients. The corporation can provide data-driven evidence for product creation by taking into account client demand, interest, or product popularity. Now you don't even have to wait for your clients to tell you what they want; you can meet their demands faster than ever before. In addition, being more creative than your competitors is a bonus [24].

2.1.2 Pricing. Big data gives information that can be used to cut costs and better allocate resources. Data gathered may be utilized to alter and improve corporate operations, which in turn reduces costs and increases profits. In addition, big data analysis makes it easier to save costs and increase efficiency. Many companies are saving a great deal of money by utilizing big data's operational cost-cutting capabilities. It is also possible to use big data to develop new goods. With the information obtained, companies can either help their clients solve problems related to big data or form partnerships with third parties that share aggregated data. Telcos, banks, and insurance providers now have new avenues for generating cash. In order to provide their customers with more relevant offers, certain merchants may be interested in using telecommunications companies' location-based data. For all sides, this is a win-win.

2.1.3 Delivery. With the help of big data, businesses can better understand their goods and make better decisions resulting in increased operational efficiency. This can be done by analyzing operational and historical data acquired from a variety of sources such as machine logs and social media, as well as the web or mobile apps [23]. There are many chances to consolidate and analyze information linked to planning and delivery operations because they are frequently documented. The collection and analysis of big data related to project planning and execution has never been easier because of the rising use of technology in projects. This data volume insights into planning and delivery-related big data could be gained by consolidating it across various business segments (e.g., information technology (IT), human resources (HR), manufacturing, logistics (logistics), and inventory management (inventory)), industries (e.g., construction and IT), economic sectors (e.g., mining and agriculture), and geographic regions (e.g., Asia-Pacific, Americas, Europe, etc.).

Project and delivery activities may benefit from big data analytics in the future [21].

2.2 Effect of Business Analysis and Big Data Project Management from the Technology Side

2.2.1 Invention. Organizations now rely on data as the foundation for their success. Massive storage capacities and data collection methods make it possible to access large amounts of data. It plays a key role in generating an enormous amount of data that must be processed in order to extract value from it. Furthermore, storing traditional data is far less expensive. This information is always changing, necessitating an innovative data analytics system and storage and analysis methods. As a result, they require thorough examination in order to yield the necessary data [17].

2.2.2 Design. For businesses, the rise of social media and weblogs led to the rise of big data. As a result, additional data sources have been added to the fundamental analytics and business intelligence (BI) activities, allowing for real-time, in-depth analytics and BI with operational integration. As the amount of digitally generated data increases at an exponential rate, data warehouse technology is having difficulty keeping up. Several studies have lately reported on the enormous amounts of raw data created by diverse data sources, requiring big data technology for analysis [16].

2.2.3 Usage. For more than a decade, researchers and businesses have been studying and implementing big data analytics. Since big data may be used in a wide range of industries and applications (such as healthcare and commercial decision-making), this is a major factor in the rise in popularity of big data. There have been numerous research and reviews published recently on big data analytics, implementations, and related technologies as a result. [12].

2.3 Effect of Business Analysis and Big Data Project Management from Industry Side

2.3.1 Standard. Using data, statistical and quantitative analysis, and explanatory and predictive modelling, business analytics helps make meaningful decisions and enhance corporate processes. Real-time and non-real-time analytics, strategic and tactic, planned and unplanned, and organized and unstructured are only few of the various types of business analytics [4]. For a long time, managers have relied on business data to guide their decisions. With business analytics, not only do they look back at the past, but they are also looking ahead to see where they can make improvements [14]. As stated by [6], business analytics is a collection of unstructured data that can't be evaluated using relational database management technologies such as big data, test analytics, web analytics, network analytics and mobile analytics. Graduates with a major in big data business analytics can pursue three distinct job paths, according to [9]: management consulting at

the top tier, financial and risk analysis, or work as a data scientist. Because healthcare managers and organizations can better translate data and have actionable intelligence based on present infrastructure, [27] recommends that the healthcare industry may start with small data analytics before using big data analytics.

2.3.2 Method. These approaches have been used to assess a significant volume of data generated by different businesses. As a result, every organization must be able to have access to increasing amounts of transactional data more quickly. Real-time data analysis aids companies in gaining a better understanding of the past and predicting the future. Therein lies the allure of real-time analytics, which gives us the ability to see what has occurred, why it has occurred, what might happen in the future, and, most importantly, what we can do about it (prescriptive) [8].

2.4 Effect of Business Analysis and Big Data Project Management from the Society Side

2.4.1 Culture. Over the past few years there has been a lot of attention paid to big data, business analytics, and "smart" environments in driving organizational decision making, as organizations are working on how to give purpose to the data, and get value-driven answers that will increase their performance [5]. Among the most major recent technology shifts in industry and academia, big data is likely to be one of the most crucial [1]. Massive amounts of information are being generated and made available online and in digital media ecosystems under the umbrella term "big data." Big data can be generated from a variety of sources, including transactions, social media posts, and sensors put in a wide variety of things (e.g., mobile phones, home appliances, cars, etc.). For example, it is possible to forecast future occurrences with the use of big data analytics and artificial intelligence, as well as to automate processes, transform businesses, and establish new sorts of businesses as it can do now [18].

2.4.2 Habits. Using big data to improve corporate operations isn't the only benefit. Opportunities for economic progress and a better standard of living exist for the society as a whole. Many industries and businesses can benefit from the use of big data analytics. These include a rise in the quality of health care and education, as well as increased safety and security for the country [7].

2.4.3 Movement. With this information, it can assist policymakers in creating rules that will allow investors to have safe playgrounds, help waste managers locate the type of garbage that is generated more frequently in a certain area, and provide insight into how to better share waste collection materials. Big data and business analytics can also be used to evaluate instructors' performance and enhance their attitude to work. It is also possible to effectively plan public transportation in large cities by utilizing mobile network location data [3].

3 SWOT Analysis

Table 1: SWOT analysis

Strengths	**Allocation of Resources:** Big data provides information that may be utilized to save expenses and distribute resources more effectively. The information acquired may be used to change and enhance company processes, lowering costs and increasing profits **Production of goods and services:** Big data analytics may be used by businesses to create new goods and services. As a result, they are more equipped to address the demands of their customers. The corporation may provide data-driven proof for product creation by evaluating client demand, interest, or product popularity.
Weakness	**High Implementation Cost:** The costs of keeping and processing massive volumes of data to understand it might be prohibitive. Traditional clinical research approaches will continue to be used since big data lacks the scientific rigor associated with RCTs. **Benefits limited audience** Furthermore, big data is meant to benefit only **Personal data security and privacy issues** Privacy and security of personal data are important problems for big data platforms. As a result, individuals may decline to engage in studies utilizing large data platforms.
Opportunities	**Marketing Campaigns** Due to the usage of big data, marketing efforts may be adapted to individual customer demands. With the aid of a good study, it is possible to predict what clients will demand in the future. It is considerably easier to build tailored advertisements for certain items using this information. **Creates insights in internal planning** Due to the increasing usage of technology in projects, using big data in project planning and execution has never been easier. This quantity and diversity of data might be utilized to perform research and get insight into how to rethink internal planning procedures and parameters in order to apply new and innovative ways.
Threats	**Ethical Issues and Genetic Screening** Excessive genetic screening, a feature of big data platforms, creates ethical concerns. Despite the multiple potentials and directions that big data may go in the future, such systems are associated with numerous risks. To begin with, recognizing risk factors might cause people anxiety, especially if the under-lying disease

is incurable or has no known solution. Insurance companies utilize this knowledge to boost premiums for those who are genetically predisposed to particular diseases, increasing the cost of care.

Threat of data loss

Data loss and third-party access are other threats to health big data systems. Finally, institutions may join together to benefit from bio-monitoring and other data gathering technologies at the expense of patients.

4 Methodology

4.1 Research Approach

The goal of this study is to examine the impact of big data and business analysis on project management, an organization that aims to be completely data-driven in all of its decision-making and quantitative data are the norm in all studies in this study. Project Managers/Specialists from companies in UAE were the study's unit of analysis. The managers were basically from different known companies of United Arab Emirates that involve Intertec Systems, Ewaan Tech, LRB infotech, DataQraft, and Tech Falcon.

The present study is descriptive in nature, as the goal is to examine the impact of big data and business analysis on project management. In this case, questionnaire was viewed the appropriate method for data collecting since it enabled project managers to respond whenever they had spare time and without the researchers' personal intervention.

The research method is based on the Simplilearn approach for digital disruption and strategies for digital transformation. This approach is based on analyzing key digital transformations across different dimensions – business, technology, industry, and society. Then they create their own digital transformation prioritization matrix to identify the digital transformation initiatives most relevant to your industry and organization. The Simplilearn investigation questionnaire is structured in 9 steps as follows:

1. List of top 10 digital transformations in the organization and a SWOT analysis.
2. A list of top 10 digital initiatives by digital native disruptors most relevant to the organization. Using a what, how, and outcome framework to brainstorm the information.
3. A list of top three digital disruptions across all four elements – business, technology, industry, and society most relevant to the organization.
4. A list of top three digital initiatives by the competitors.
5. A list of top three digital disruptions across all the five key areas of disruption that are most relevant to the organization. We are making progress with our understanding of digital initiatives. Now how about getting some ideas going? Let's look at each of the key

areas of digital disruption one by one using the trend-benefit framework

6. A list of top three transformations across the following key technologies that are most relevant to the industry.
7. Based on the previous steps, a list of all key transformations compiled.
8. A list of transformations made across the impact/difficulty matrix.
9. The most relevant digital transformation plans identified.

The 9 steps gathered based on 30 interviews conducted with key leaders, project managers, technology specialists, and digital transformation specialists.

Details about the above nine steps are provided in appendix A.

5 Analysis

As previously said, data collection for the study took a long time; as a consequence, the researcher wanted to double-check the data's correctness before going on to data analysis. The data analysis phase of this research is critical since the findings will be utilized to draw inferences from the investigation's overall outcomes. Data analysis, in this context, refers to the process of verifying, purifying, altering, and changing data after it has been received in order to arrive at a valid result. In order to meet the research objectives, the researcher was charged with selecting the most appropriate data analysis technique for this study, taking into account the nature of the data obtained. In this study, the researcher employed certain methods to investigate quantitative data, as outlined in the previous chapter. The goal of finding the best technique is to exclude data that isn't relevant to the study or to spot problems in the research. As previously stated, this study gathered data in quantitative format. The goal of finding the optimal approach is to exclude data that isn't relevant to the study or to spot weaknesses in the research.

Several interviews were conducted based on secondary data, and project managers were asked a variety of questions about Big data and its use. Several structured questions were asked from the project managers in their interviews and these inquiries came in the form of a questionnaire. The following is a list of the answers to these questions:

5.1 "Can Big Data Handle Large-Scale Real-Time Applications?"

5.1.1 Interpretation. In question 1, we asked our respondents can big data handle large-scale real-time applications while the Likert scale for this question was 1 to 5 (Yes, More likely, Neutral, No, Not at all). As Figure 1 shows that almost 25% of people rated it "Yes" and suggested the idea that yes, big data can handle large-scale real-time applications, while 32% rated it "More Likely to" and suggested the idea that Big data can handle large-scale real-time applications to a great extent, while 30% had biased views and

they opted neutral, 8% disagreed with the idea, and remaining 5% opted "Not at all", meaning they totally disagreed with the idea. Also, the total number of project managers that answered our question was 15, while this question was asked from all 20 managers, which means 5 people skipped it intentionally. In a nutshell, our analysis s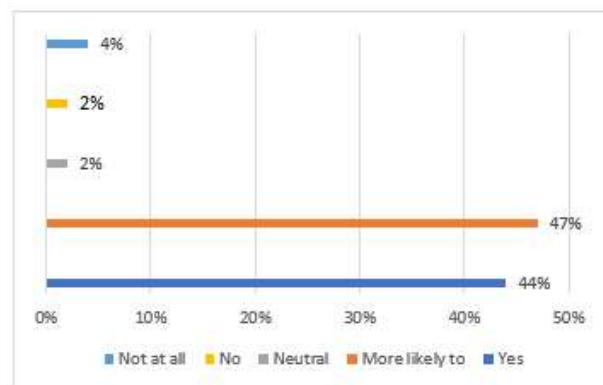hows that most rated their response as "More likely to" and least rated this idea as "Not at all," i.e., 5, which is 32% and 5%, respectively.
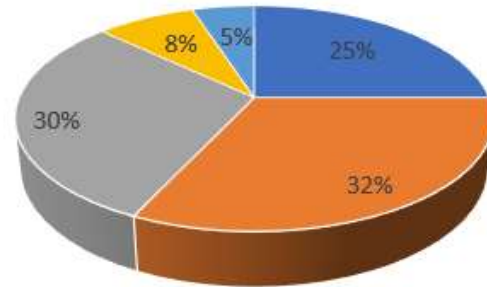
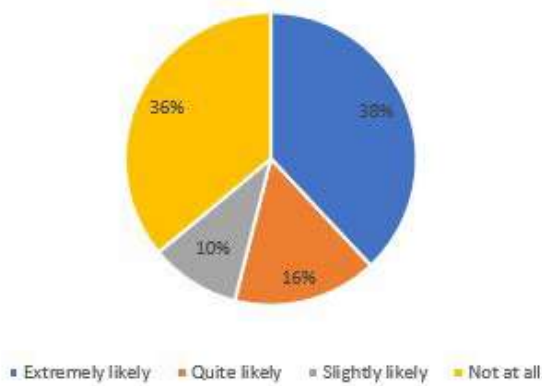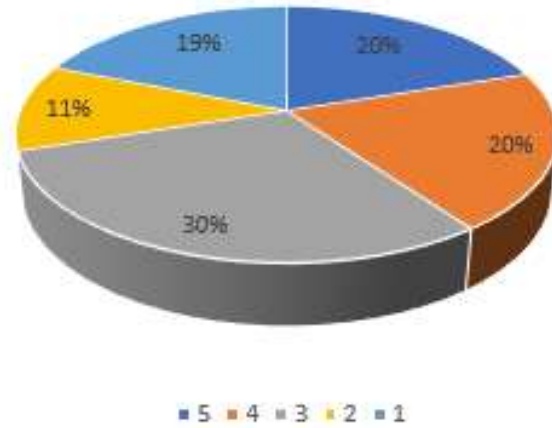Figure 1: Scaling about big data

5.2 "Does Big Data Help to Improve Costs?"

5.2.1 Interpretation. In question 2, we asked our respondents does big data help to improve costs while the Likert scale for this question was 1 to 5 (Yes, More likely, Neutral, No, Not at all). As Figure 2 shows that almost 44% of people rated it "Yes" and suggested the idea that yes, big data helps to improve costs, while 47% rated it "More Likely to" and suggested the idea that big data helps to improve costs to a great extent, while 2% had biased views and they opted neutral, 2% disagreed with the idea and remaining 4% opted "Not at all", meaning they totally disagreed with the idea. Also, the total number of project managers that answered our question was 14, while this question was asked from all 20 managers, which means 6 people skipped it intentionally. In a nutshell, our analysis shows that most rated their response as
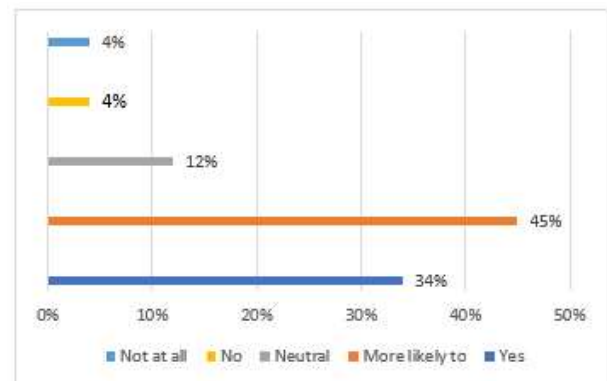

Figure 2: Scaling about big data

5.6 "Which is More Important (1) Client Demand, (2) Interest, or (3) Product Popularity in Terms of Data-Driven Popularity?"

5.6.1 Interpretation. In question 6, we asked our respondents which is more important (1) client demand, (2) interest, or (3) product popularity in terms of data-driven popularity? While the Likert scale for this question was 1 to 3. As Figure 6 shows that almost 40% of people opted for "client demand", while 35% opted for "product popularity," while 25% chose "interest". Also, the total number of project managers that answered our question was 15, while this question was asked from all 20 managers, which means 5 people skipped it intentionally. In a nutshell, our analysis shows that most opted for "client demand" while least opted for "interest."
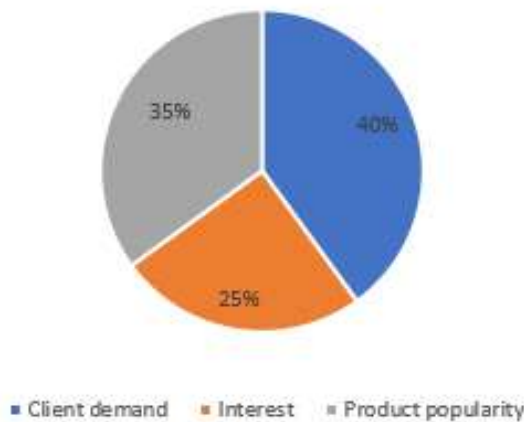

Figure 6: Scaling about big data

5.7 "On a Scale of 1-5, to What Extent the Rise of Social Media and Weblogs have Led to the Rise of Big Data?"

5.7.1 Interpretation. In question 7, we asked our respondents on a scale of 1-5, to what extent the rise of social media and weblogs has led to the rise of big data? While the Likert scale for this question was 1 to 5. As Figure 7 shows that almost 44% of people rated it "1" and suggested the idea
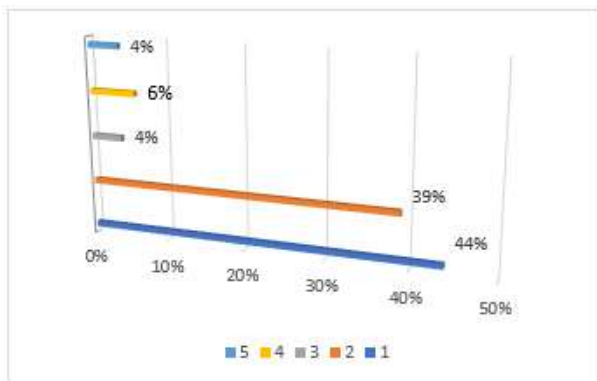

Figure 7: Scaling about big data

to a very lesser extent, while 39% rated it "2," i.e., More Likely to, and suggested the idea that the rise of social media and weblogs have led to the rise of big data, while 4% had biased views and the "3," i.e., neutral, 6% agreed with the idea and remaining 4% opted "5", meaning they totally agreed with the idea. Also, the total number of project managers that answered our question was 16, while this question was asked from all 20 managers, which means 4 people skipped it intentionally. In a nutshell, our analysis shows that most rated their response as "1" and least rated this idea as "5", which is 44% and 4%, respectively.

5.8 "Can Business Analytics be Evaluated Using Relational Database Management Technologies? If yes, which is More Valid? (Big Data, Test Analytics, Web Analytics, Network Analytics, or Mobile Analytics)"

5.8.1 Interpretation. In question 8, we asked our respondents whether business analytics can be evaluated using relational database management technologies. If yes, which is more valid? (big data, test analytics, web analytics, network analytics, or mobile analytics) while the Likert scale for this question was 1 to 5. As Figure 8 shows that almost 40% of people chose "big vata" and suggested the idea that yes, big data is more valid, while 25% chose "web analytics" and suggested the idea that it can be relatively more valid than other sources, while 20% chose test analytics, 10% chose "mobile analytics," and the least of all was considered to be "network analytics". Also, the total number of project managers that answered our question was 14, while this question was asked from all 20 managers, which means 6 people skipped it intentionally. In a nutshell, our analysis shows that most managers considered "big data" to be valid while least considered "networking analytics" as valid.
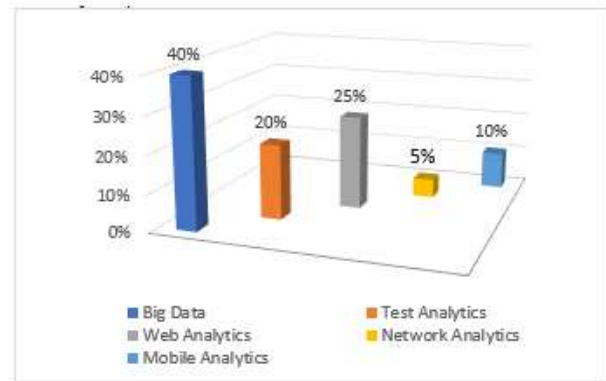

Figure 8: Scaling about big data

5.9 "Can we Give Purpose to Data and Get Value-Driven Answers that will Increase Their Performance?"

5.9.1 Interpretation. In question 9, we asked our respondents can we give purpose to data and get value-driven answers that would increase their performance? We asked our

respondents to rate their opinion on a scale of 1 to 5 (Yes, more likely to, Neutral, Less likely to, and Not at all). As Figure 9 shows that almost 30% of project managers rated it as 1 and suggested the idea that Yes, we can give purpose to data and get value-driven answers that will increase their performance, while 25% rated it "2", and suggested the idea that it is more likely to happen, while 20% had biased views and they opted the option 3 "neutral", 10% disagreed with the idea and opted "4," and 15% chose "5" as they didn't agree with the idea at all. Also, the total number of project managers that answered our question was 15, while this question was asked from all 20 managers, which means 5 people skipped it intentionally. In a nutshell, our analysis shows that most rated their response as "1" and least rated this idea as "4".
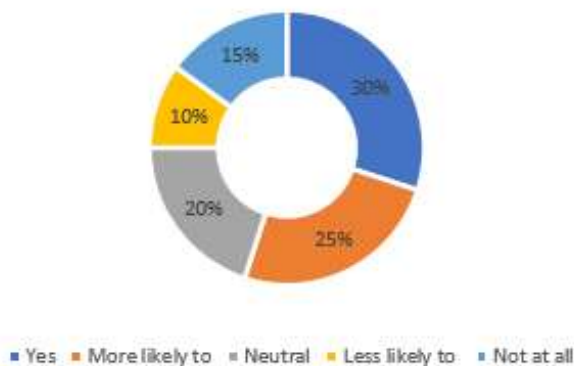

Figure 9: Scaling about big data

5.10 "Can We Expect Opportunities for Economic Progress and a Better Standard of Living for the Society as a Whole Through Big data?"

5.10.1 Interpretation. In question 10, we asked our respondents can we expect opportunities for economic progress and a better standard of living for society as a whole through big data? And we asked our respondents to rate their opinion on a scale of 1 to 5. As Figure 10 shows that almost 30% of project managers rated it as "Yes" and suggested the idea
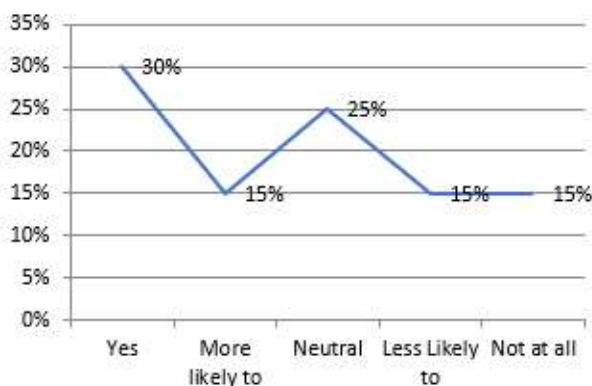

Figure 10: Scaling about big data

that yes, we can expect opportunities for economic progress and a better standard of living for society as a whole through big data, while 15% opted more "More Likely to", 25% had biased views, and they opted the option 3 "Neutral", 15% opted "Less likely to", while 15% opted "No, not at all". Also, the total number of project managers that answered our question was 15, while this question was asked from all 20 managers, which means 5 people skipped it intentionally. In a nutshell, our analysis shows that most rated their response as "Yes" and least rated this idea as "Not at all."

6 Conclusion

Working with data is one of the most crucial subjects for today's company leaders. Data, in particular, has the power to change project management practices, according to nearly nine out of ten financial professionals. Big data and analytics are among the top ten company priorities for slightly more than half of CEOs, according to recent study. All of this indicates that, after the recent IT revolution, project management is moving toward a data-driven future. Big data might have a favorable impact on how the project management office performs its tasks. Big data has a big influence on project and resource management, from cutting project costs to enhancing project efficiency to resource allocation optimization. As this report was specifically made to analyze the effect of business analysis and big data on project management, we conducted structured interviews from our project managers and came to know that big data software is typically identified by its ability to store, access, and manage datasets in a reasonable length of time. It's vital to keep in mind that big data tools can potentially gather and generate incomplete data. Different questions were asked from project managers, and they answered us and helped us to comprehend business, big data and its significance in project management.

Below mentioned impacts have been analyzed in this project.

- **Helps to reduce the complexities of projects**
  Improper methodologies, a lack of expertise, or a misinterpretation of the information provided on crucial project areas can all contribute to the project's complexity. Big data analysis may help to improve the projects by helping us to rapidly discover project challenges and problems, which can help to reduce the project complexity.
- **Helps to reduce the cost of project**
  Project managers will be able to better foresee patterns and occurrences in their business by acquiring more data. Big data analysis is the process of gathering a large quantity of data in order to foresee events and trends in one's sector. This improves the efficiency of the resource forecast and planning process by providing a library of data that is required for a successful budget, calendar, assessments, and other components of project delivery.
- **Helps to enhance the project risk management**
  Big data provides important information on a company's

operations, goods, and services. Engines and other project difficulties can be identified and fixed promptly, allowing each project and the company to perform at its best. Because project management is dynamic and influenced by a number of internal and external circumstances, it is susceptible to a variety of risks that might jeopardize your success. Project management risks must be actively and continuously identified and controlled, as all-risk occurrences are documented and fire-fighting efforts are recognized and addressed. Big data analytics allows for a more accurate evaluation of project challenges and risks, as well as a decrease in their influence on operations and outcomes.

6.1 Concluding Thoughts

Big data is just as savvy as the tools you use to analyze it. Big data offers several chances to improve the competencies of your team and the project management process. It enables users to find information that effects the outcomes of their initiatives, independent of their intended aim. As a thriving profession, project management is entrusted with making technology developments relevant and original. Big data analytics is a technology that may be utilized for both business and project management. Big data is used to assess previous and current information, as well as future data, to anticipate the possibility that your project will provide results, as well as to make data-driven decisions and increase efficiency.

7 Recommendations

Handling with data is one of the most crucial subjects for today's company leaders. Data has the capacity to change organizational practices, according to nearly nine out of ten financial experts. Big data and analytics are among the top ten company priorities for slightly more than half of CEOs. All of this shows that, following the recent IT revolution, industry is entering a data-driven era.

- The implementation of a big data management system is a costly undertaking that, if done incorrectly, may result in significant losses. It's better not to overlook this factor.
- Again, for informed resource allocation, planning and calculating at least a preliminary scale of activities with big data is required to obtain the desired results.
- Organizations are changing in the digitization and Industry 4.0 period. Companies aiming to compete must adapt to a changing world by adopting activities to satisfy changing client and market expectations. Project managers should accept change as the global trend shifts. Companies all across the world are undergoing a process known as "digital transformation."

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