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Application of Business Analytics in Healthcare Industry

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ABSTRACT
The analytics will play a crucial role in putting healthcare system in organised way. As more healthcare systems capture information electronically and as they begin to collect more novel forms of data. In this article, we believe that analytics will play a fundamental role in the transformation of the healthcare system. However, there are lot of challenges implementing analytics in healthcare system includes like the lack of data standards, barriers to the collection of high-quality data, and a shortage of qualified personnel to conduct such analyses. There are also multiple managerial issues, such as how to get end users of electronic data to employ it consistently for improving healthcare delivery, and to manage the public reporting and sharing of data. In this article, we explore applications of analytics in healthcare, barriers and facilitators to its widespread adoption, and how analytics can help us achieve the goals of the modern healthcare system: high-quality, responsive, affordable, and efficient care.
Keywords: Healthcare; Analytics; Information technology.

I. INTRODUCTION

The global healthcare industry is experiencing fundamental transformation as it moves from a volume-based business to a value-based business. With increasing demands from consumers for enhanced healthcare quality and increased value, healthcare providers and payers are under pressure to deliver better outcomes. Primary care physician and nursing shortages require overworked professionals to be even more productive and efficient. The cost dynamics of healthcare are changing, driven by people living longer, the pervasiveness of chronic illnesses and infectious diseases, and defensive medicine practices. New market entrants and new approaches to healthcare delivery are increasing complexity and competition. As tumultuous as the current environment is, it is expected to become even more complex over the next several years. Among healthcare executives interviewed for the 2010 Global CEO study, 90 percent expect a high or very high level of complexity over the next five years, but more than 40 percent are unprepared to deal with it. This immense complexity confronting the healthcare industry will require smarter, more informed decisions to enable the improved outcomes and better value required by market dynamics, increasing governmental regulation, and today's more demanding consumers. By James W. Cortada, Dan Gordon and Bill Lenihan Analytics can provide the mechanism to sort through this torrent of complexity and data, and help healthcare organizations deliver on these demands. To determine how to apply analytics to their current challenges, gain insight and achieve faster time to value, we asked 130 healthcare executives from around the world the following questions:

• How are healthcare provider and payor organizations applying analytics today, and how might they need to think about its future use?
• How do high performing organizations use it differently than their peers?
• What are the barriers to adoption?
• What forward-looking analytics innovations can healthcare organizations apply to meet their mounting challenges?

Through our analysis of our interviews with executives, we advanced our understanding of:
• Why analytics competency is more important than ever

• How top performing healthcare organizations are using analytics to influence outcomes, create differentiation and drive revenue growth
• The analytics sophistication model
• The barriers to analytics
• Best practices in getting started or accelerating your journey along the path to analytics competency.

II. REVIEW OF LITERATURE

In recent years, the number of publications on the application of business analytics in Health care Industry is growing. However, most of the data is found in technical literature, research, or print media articles. The studies undertaken by varied alternative analysers within the past concerning the present research drawback are reviewed during this. an in-depth review has been created to search out the analysis gap and to spot the possible problems for the study. varied studies, books and journals have helped the analysis to check with these eventualities collected through primary knowledge. The secondary knowledge helped to know the importance and usefulness of cloud accounting in accounting corporations.

James W. Cortada, Dan Gordon and Bill Lenihan in their article - Healthcare organizations around the world are challenged by pressures to reduce costs, improve coordination and outcomes, provide more with less and be more patient centric. Yet, at the same time, evidence is mounting that the industry is increasingly challenged by entrenched inefficiencies and suboptimal clinical outcomes. Building analytics competency can help these organizations harness "big data" to create actionable insights, set their future vision, improve outcomes and reduce time to value.

Michael J. Ward, Keith A. Marsolo, Craig M. Froehle in their article - The American healthcare system is at a crossroads, and analytics, as an organizational skill, figures to play a pivotal role in its future. As more healthcare systems capture information electronically and begin to collect more novel forms of data, such as human DNA, how will we leverage these resources and use them to improve human health at a manageable cost? In this article, we argue that analytics will play a fundamental role in the transformation of the American healthcare system. However, there are numerous challenges to the application and use of analytics: the lack of data standards, barriers to the collection of high-quality data, and a shortage of qualified personnel to conduct such analyses. There are also multiple managerial issues, such as how to get end users of electronic data to employ it consistently to improve healthcare delivery and how to manage the public reporting and sharing of data. In this article, we explore applications of analytics in healthcare, barriers and facilitators to its widespread adoption, and ways in which analytics can help us achieve the goals of the modern healthcare system: high-quality, responsive, affordable, and efficient care.

Healthitanalytic.com In their article - Business intelligence, **defined by Gartner** as "an umbrella term that includes the applications, infrastructure and tools, and best practices that enable access to and analysis of information to improve and optimize decisions and performance," is essential for helping healthcare providers gain visibility into opportunities for improvement.

Research Gap

Very few previous studies have addressed on the importance of Business Analytics in Health care Industry. This thesis identifies the subsequent analysis gap. First, no previous analysis explains psychological feature factors that influence Business Analyticsimplementation in Health Care. Second, no challenges involved in implementing of the business analytics in Health care industry in real world.

Research Objectives

• Why analytics competency is more important than ever
• How top performing healthcare organizations are using analytics to influence outcomes, create differentiation and drive revenue growth
• The analytics sophistication model
• The barriers to analytics
• Best practices in getting started or accelerating your journey along the path to analytics competency

Research Questions

• How are healthcare provider and payor organizations applying analytics today, and how might they need to think about its future use?
• How do high performing organizations use it differently than their peers?
• What are the barriers to adoption?
• What forward-looking analytics innovations can healthcare organizations apply to meet their mounting challenges?

Scope of the Study

The scope of the research is to understand the role of Business Analytics in Health care industry and its adoption among Health care Sector.

1. The research is based on primary as well as secondary data.

2. This research is studied broadly about the various Business Analytics tools and its Integration.

Research Methodology

This thesis introduces a theoretical framework consisting of four theories, whereas each theory aims to answer one specific sub research question. To conduct the study, a qualitative research approach is used to close the research gap and answer the sub research questions. In such, the study is exploratory and interpretative in nature.

The empirical study is conducted in case study research on Business analytics in health care user and provider which are interrogated in semi-structured interviews. The motivation for cases study research is rooted in repeated calls from business analytics researchers who point towards a demand of theoretical explanations of Business Intelligence in health care practices is needed, and case studies are a powerful tools.

III. DATA ANALYSIS

This Explanatory Study Research was constructed with Descriptive (Quantitative) methods. Conducting quantitative research involved survey questionnaires. In this there are three phases. The first phases involved conduct a survey. The second phase shared a survey link. The third phase was to complete the survey and determine the result. The survey research sustains an objective approach.

Collection of primary data: Primary data was gathered by using well-structured questionnaire as tool for data collection that was filled by 30 (Thirty) members. The questionnaire was sent to respondents using WhatsApp. The respondents were professionals of different age group. (18years to 45+years)

Collection of secondary data: The researcher collected secondary data for the study from books, journals, periodicals, newspapers, articles, website of government publications, proceedings, annual report, and other published records etc., the collected data was properly tabulated and analysed.

Limitations of study:

1. The data was collected from few of my colleagues through Google forms. Therefore, they may have not provided accurate data as no face-to-face research was undertaken.
2. Research is purely based on potential software options for software businesses.
3. The studies are focused only on the awareness of business analytics features offered by service providers. The legal regulations and obligation of service providers are not taken into consideration.

Sample size: The sample size is the proportion of the general population that is taking part in the study. The sample size is 30 respondents. Total thirty (30) Respondent's data were collected.

Hypothesis:

Hypothesis 1: Most of the colleagues would not have been aware with the concept of Business analytics.

Hypothesis 2: Lack of awareness and regarding the usefulness of Business Analytics in Health care Industry is the major constraint for non-acceptance of Business Analytics in Health care Industry.

Hypothesis 3: For Health care industry it is very hard to implement Business Analytics in routine day to day work while acceptingor implementing feature in Health care system.

IV. OBSERVATIONS/FINDINGS

Business Analytics requires huge amount for implementing and technical expertise for using Business Analytica (Business Intelligence or Data Visualization)applications. Responses from 30 colleagues were received.

- Demographic profile of respondents

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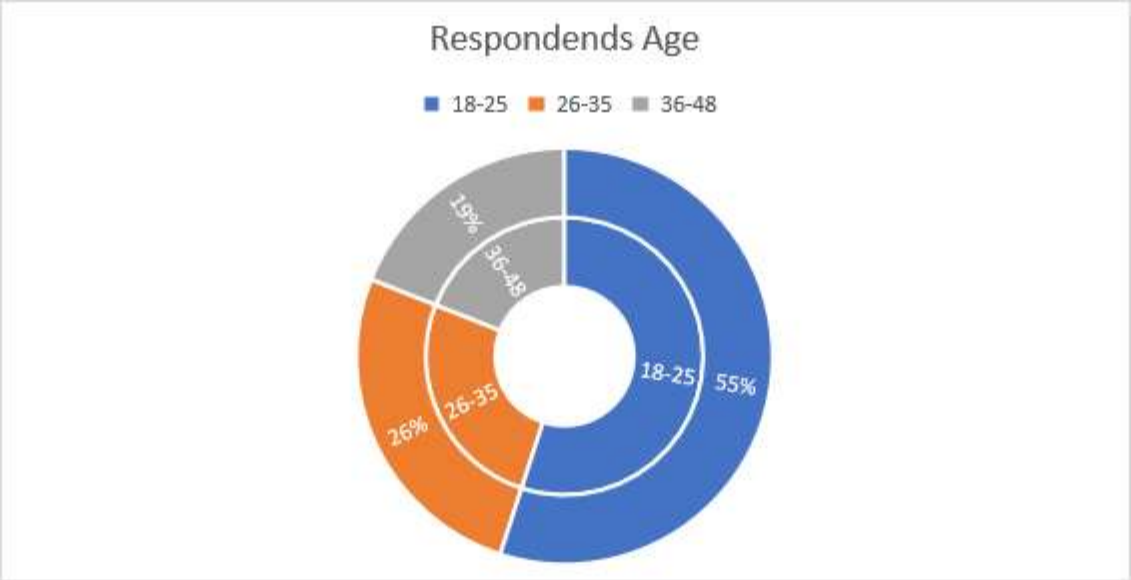

Fig.2

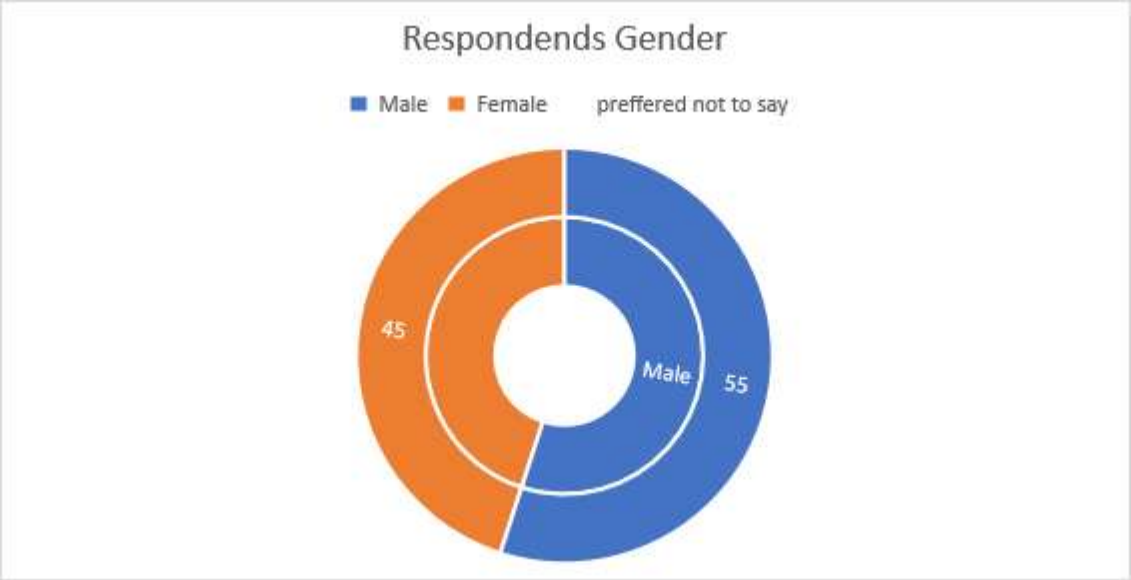

Fig.3

Interpretation: Out of 30 respondents there are 55% males i.e., nearly 16 male and rest of them are females i.e., 14 people. Among them around 55% respondents were under age group of 18-25 years ,26% respondents were under age group of 26-35 years, 19% respondents were under age group of 36-45years.

➢ Classification of respondents based on Education

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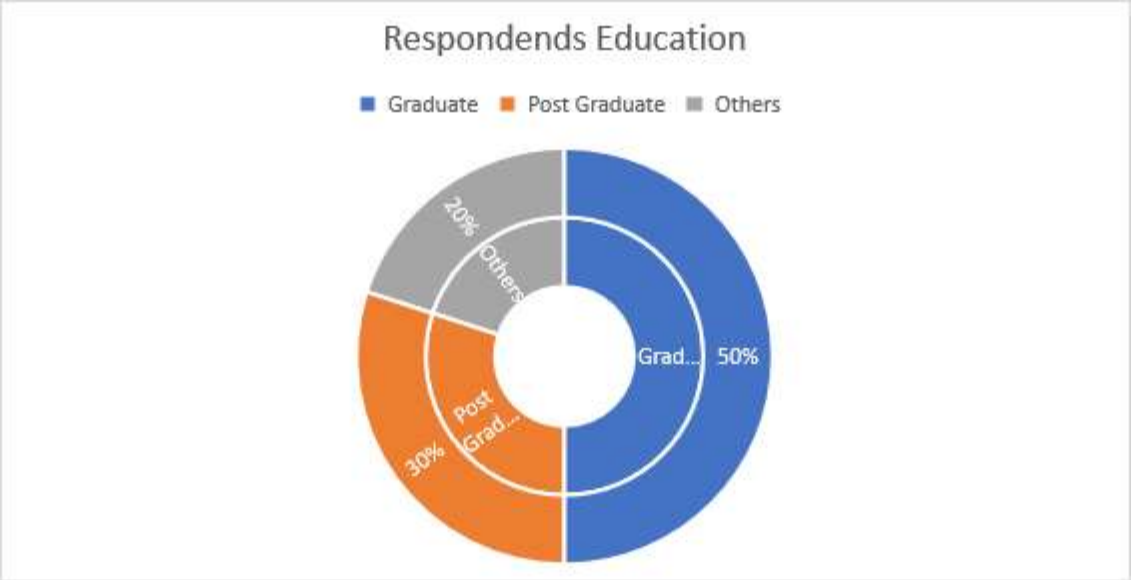

Fig.4

Interpretation: Here 50% respondents were categorized into post graduates ,30% respondents were categorized into graduates and 20% into others.

- Classification based on awareness of Business Analytics/Visualization software's

Fig.5

Interpretation: Here 60% respondents are aware about Business analytics/software's ,32% were not aware and remaining 8% were partially aware.

- Classification based on usefulness of Business Analytics in Health Care Industry.

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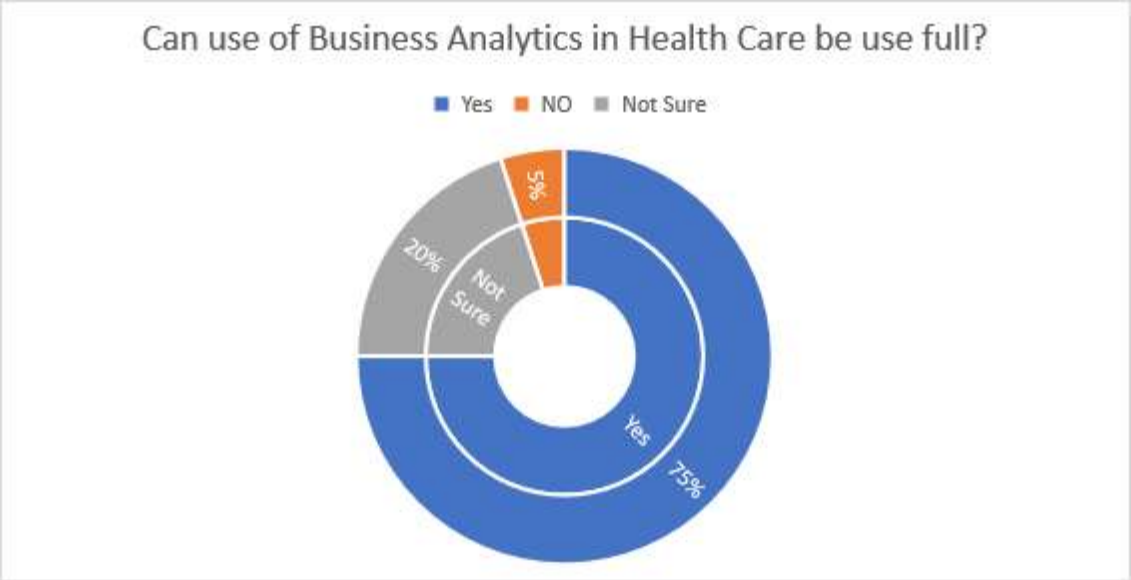

Fig.6

Interpretation: Out of all the respondents 73.3% accepted that Business Analytics is best for Health care Industry, 20% respondents have accepted just partially and remaining 6.7% has not accepted that Business Analytics is best for Health care Industry.

- Classification based on usage of Business Analytics for Health care in future

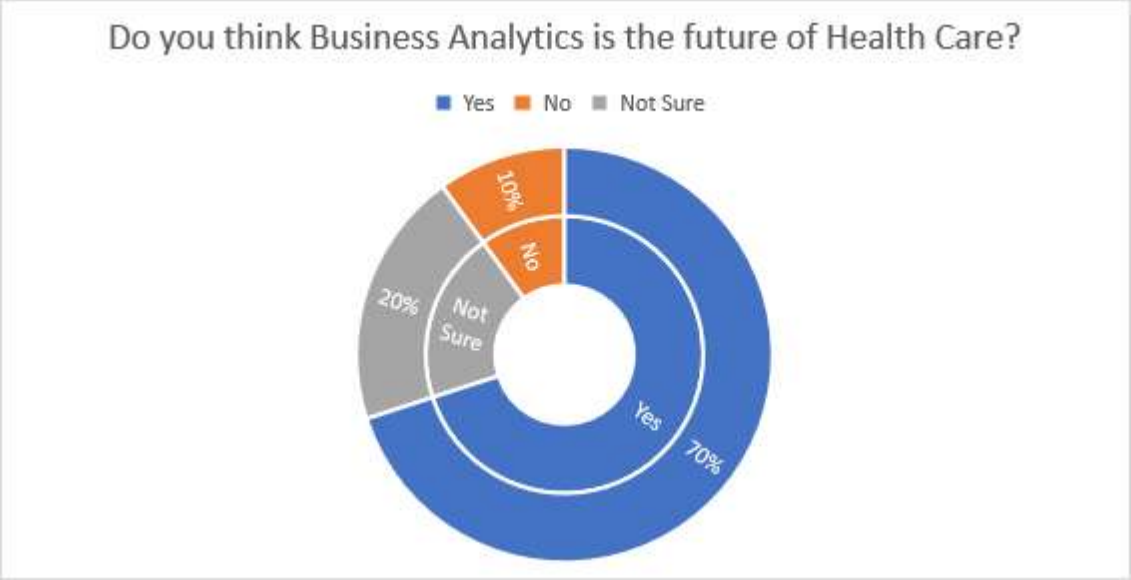

Fig.7

Interpretation: 70% respondents were looking forward to work with the Business Analytics for Health care and 20% respondents maybe willing to work in future and remaining 10% respondents were not willing to use these technology in future.

- Classification based on selection of accounting software

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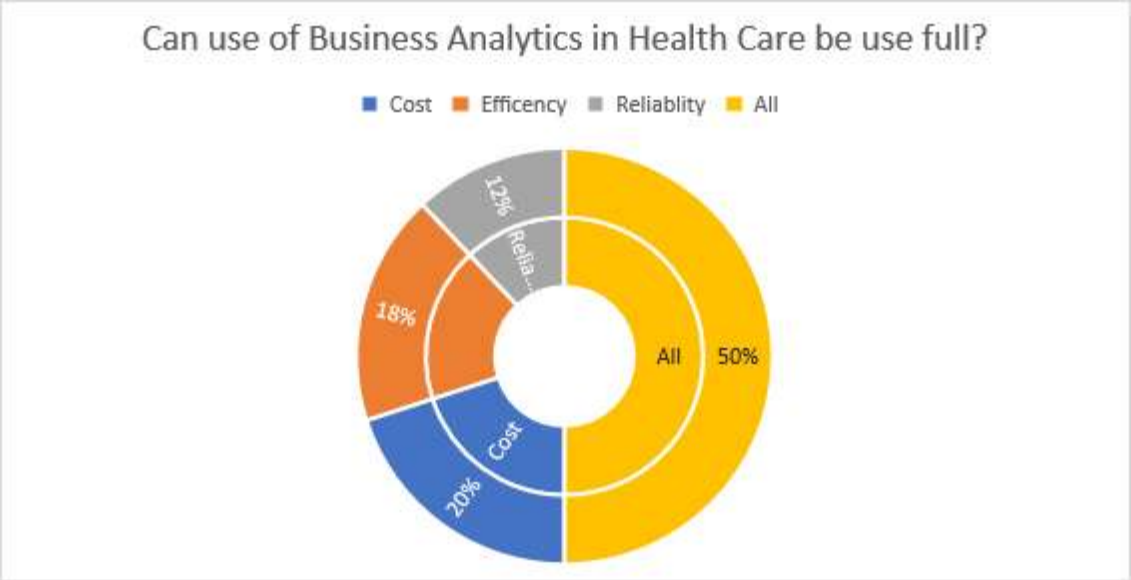

Fig.8

Interpretation: 50% respondents have chosen to select the software based on cost, Efficiency and reliability where as 20% have chosen to select based on Cost, 18% have chosen Efficiency and remaining 12% each based on reliability.

➢ Classification derived for using of different Business Analytics software's

Fig.9

Interpretation: Based on the above classification many people have approached to select Congos, Power BI, Tablue, Micro Strategy, Qlik, Thought Spot.

FEATURE	Cognos	Power BI	Tableau	MicroStrategy	Qlik	ThoughtSpot
Web-based or Desktop development	Web	Both	Desktop	Both	Both	Web
Data	Both	Both	Both	Both	Both	Both

Import or Direct Query						
Gartner Mode 1	Yes	Yes	Limited	Yes	Yes	
(extension req'd)	No					
Formatted production style reporting, scheduled distributed reports - requirements are well-understood in advance and can be identified by a process of analysis						
Gartner Mode 2	Yes	Yes	Yes	Yes	Yes	Yes
Visual-based exploration, agile, self-service, exploratory, involving experimentation to solve new problems, and optimized for areas of uncertainty.						
Use of Stories	Yes	No	Yes	Yes	No	Yes
(not narrative)						
Allow for analytics be presented in a narrative						

form and allows for creation of a presentation like PowerPoint but using live data.						
Text Box Prompts	Yes	No	No	Yes	Yes	No
Expression-Based Conditional Formatting	Yes	Yes	No	Yes	Yes	No
Multiple data source connections in the same report	Yes	Yes	Yes	Yes		
(extension req'd)	Yes	Yes				
Jupyter Notebooks integration	Yes	No	No	Yes	No	No
Open-source web application that allows for creation and sharing of documents that contain live code, equations, visualizations, & narratives.						
Export to PowerPoint	No					
(included add-on req'd)	Yes	Yes	No			
(office add-on req'd)	Yes					

(extension req'd)	No					
Export to Excel with formatting	Yes	No	No	Yes	No	No
Report Bursting	Yes	No	Yes	Yes		
(w/ Narrowcast Server)	No	No				
Generates targeted report output based on data from a single report run that is divided amongst the subsets.						
Email reports to a distribution list	Yes	Yes/No				
(depends on Version)	Yes	Yes	Yes			
(extension req'd)	Yes					
Custom D3 Visualizations	Yes	Yes	No	Yes	Yes	No
D3 is a JavaScript library for producing dynamic, interactive data visualizations in web browsers						
Schematics visuals	Yes	No	Yes	Yes	Yes	
(extension req'd)	No					
Ability to map data to custom vector						

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image. (i.e. - airline seating chart)						
Row level security	Yes	Yes	Yes	Yes	Yes	Yes

Table.1

The business environment in each industry is unique, which means that findings cannot be generalized to other industries reliably. As a result, understanding of why Business Analytics is so popular in the Health care industryis non-existent, due to the lack of literature. According to Capterra ‘s database and sorting feature, it was shown that above mentioned are the most popular Business Analytics for Health care.

- Classification based on the most desired business analytics software features that they will look in

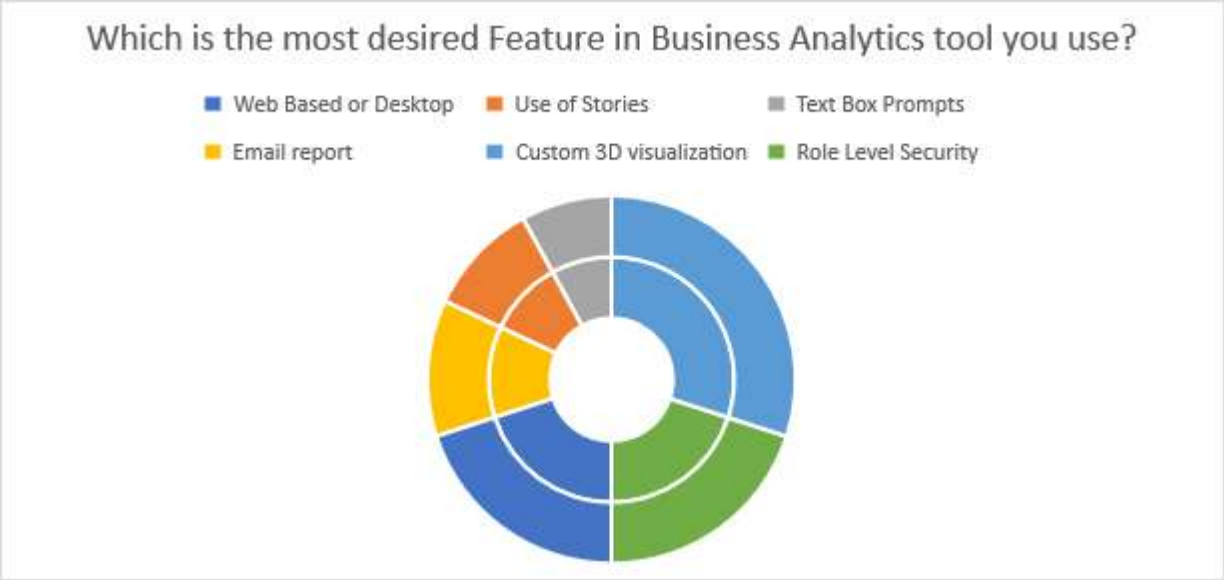

Fig.10

Interpretation: The most desired features that the respondents will work using Business analytics software are Web Based or Desktop, Use of Stories, Text Box Prompts, Email report, Custom 3D visualization and Role Level Security.

FINDINGS: As a result of systematic analysis of data obtained for the present study, Investigators observe the following facts about the awareness and uses of Business analysis software.

H1: Rejected: Around 70% respondents from all 30 respondents are aware with the term Business Analytics Thus, Hypothesis -1 i.e. Most of the colleagues would not have been familiar with the concept of Business Analytics, is rejected.

H2: Accepted: Majority of respondents who are not using Business Analytics accounting application i.e., 20% because of lack of awareness of Business Analytics in Health care. Thus, Hypothesis-2 i.e., Lack of awareness and regarding the usefulness of Business Analytics for Health care purpose is the major constraint for non-implementation of Business Analytics for Health care, is accepted

H3: Rejected: as stated above, accounting firm expected to have a most used routine day to day accepted feature in Business Analytics software rather than more experimental one. Thus, Business Analytics in health care industry is updating and introduction of new feature are still coming up which results, is rejected.

V. CONCLUSION

Analytics is increasingly weaving itself into the fabric of healthcare and will fundamentally shape the future of medicine and care delivery. The number of applications seems to grow unabated. With opportunities such as the ability to improve the efficiency of healthcare while improving the

quality of care, mine genetic data, reduce costs, effectively respond to disasters, and numerous other goals, the application of analytics is broad and far. However, such a vision will not be easily achieved. There are numerous challenges along the way. These issues include privacy concerns, the collection and availability of high-quality data, data standards, the communication of data to end-users and even having enough qualified personnel to deliver on such promise. While formidable, these issues are not insurmountable. However, they are necessary to ensure that the application and understanding of analytics in healthcare will continue to grow and play an increasing role in healthcare systems of the future.

VI. FUTURE SCOPE

The study can be undertaken by taking those health care businessesworldwide were increasingly adopting business analytics, artificial intelligence and agile delivery methods in their business practices before COVID-19 struck, the process has surprisingly accelerated post the pandemic. Business analytics, widely known for its diagnostic, predictive and prescriptive prowess, has gained tremendous traction in the last year as governments and healthcare institutions embraced this progressive approach to overcome organisational obstacles and provide long-lasting solutions. As per Mckinsey, business analytical capabilities are projected to create $9.5 trillion to $15.4 trillion annual economic impacts across nineteen industries worldwide, of which 40% can be credited to AI implementation. This article will analyse the scope of business analytics in health care industry and shine a light on how business leaders have updated their approach towards business decision-making.

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