



Impact of Business Analytics in decision making and forecasting: An empirical study on the Hotel industry in Bangladesh

Sabrina Kabir

Graduate Student
Bachelors of Business Administration,
University of Dhaka, Dhaka, Bangladesh

Abstract : In order to forecast trend and demand and take decision that cater to those need of client's and market, service providers have to focus on data collection and information related to client. The process will eventually enhance guest's satisfaction and understand client's demand more efficiently. The thesis paper aims to evaluate the impact of business analytics in decision-making and forecasting in terms of the Hotel Industry in Bangladesh. The usage and implication of business analytics is not widely seen in Bangladesh specially how such techniques can be utilized to the betterment of hotel industries has not fully explored yet. Moreover, the integration of the tools of business analytics towards decision making and forecasting remains a challenge for hotel industries which requires specialized people to analyze data and make proper use of them. Data analytics is becoming more important to businesses all around the globe. An edge in a competitive business climate may be gained by having the correct information at hand. It is no different in the hotel business. Hotel marketing strategy, client loyalty, and productivity are all dependent on data analytics. Hoteliers may customize their visitors' experiences, implement smarter pricing strategies, and extend their client base with the use of this technology. Hence this thesis paper is focused on implication of business analytics and aims to provide valuable insights on the prospects of decision making and forecasting in hotel industries through deploying business analytics.

Key Terms - Business Analytics, Decision-making, Forecasting, Hotels, Hospitality Industry, Business Intelligence, Data

I. INTRODUCTION

1.1 Background of the Study

Business Analytics is the practice through which firms employ statistical techniques and technology for evaluating historical data to obtain fresh insight and enhance strategic decision-making. Business analytics has been an essential tool in investigating the behaviour, pattern and trends in the market. It is the combination of data, information technology, statistics, quantitative analysis as well as computer-based methods. The combination of all these is important in making better decisions which will serve the needs of the customer and eventually increase revenue for the company. Not only in decision making, through data interpretation it is possible to forecast future needs and trends in order to keep pace with a competitive market. This in turn provides a competitive advantage to the company. Data mining, predictive modelling, and statistical analysis are some of the methodologies used in business analytics, which is a subset of business intelligence that focuses on analyzing and transforming data into valuable information, identifying and anticipating trends and outcomes, and making better business decisions based on that information.

Business analytics has a wide range of applications and usages. It can be used for descriptive analysis where data is manipulated to understand past and present situations. It is also used for predictive analysis which is mostly used for assessing and comparing previous business performance to have a better outcome from future performance through making changes.

1.2 Statement of the Research Issue

There have been few investigative studies that focused on the use of business analytics in the hotel industry in Bangladesh. Therefore, hotels can use the data from this paper to understand the impact of business analytics for making data-driven decisions

and forecasting. In order to organize data and develop a competitive strategy for cost effective hotel management and hospitality industry the usage of business analytics is immeasurable.

To understand the application of business analytics, the focus must be on the various types of systems that a hotel can have and how they integrate those systems with each other. Then the next step comes the analytical systems and how this can help define strategies and improve decisions of business based on different analytical models and key performance indicators (Ghorapade, 2018). In order to achieve this goal, it is essential to approach the integration of various information systems used in a hotel.

1.3 Significance of the Study

For the past few years, the hospitality industry in Bangladesh has been integrating business analytics for improving their efficiency and effectiveness. There has been very little research on the impact of business analytics in the hotel industry in Bangladesh. After conducting a thorough quantitative survey, the rationale for creating this paper was realized. There is a need to conduct research and gather information on whether there is a positive or negative relation between business analytics and decision-making and forecasting.

The purpose of the study and research focuses on the application of Business Analytics techniques in the hospitality sector. Various roles played by different subcomponents of business analytics have been expounded on, showing how each element supports the effectiveness of the business intelligence in the hospitality sector. The hospitality industry faces challenges in storing such a huge volume of data related to industry but with analytical tools it is possible to provide information that adds value to business and help making better decisions. Not only this, new innovations can be introduced as well as adopted in the hospitality sector with the help of business analytics.

1.4 Objective of the Study

This thesis paper aims to identify the impact and contribution business analytics can have on escalating hotel industries performance through proper decision making and forecasting the future. The research study will focus on the following objectives:

1. To investigate the impact of business analytics on decision-making in the hotel industry.
2. To examine the impact of business analytics on forecasting in the hotel industry.

1.5 Scope and Limitations

The research paper is inclined towards examining the growing trend towards the adoption of new types of services accomplished through the implementation of business analytics. There are limitations as well which hindered proper investigation of research.

Scopes:

Business analytics can be used in various places such as Business analytics helps keep track of guests' visits, record their special events. It helps the management team send promotional emails with special packages to the loyal customers according to their choices to maintain strong customer relationships. Using business analytics, management team can decide the appropriate time for advertisements. It helps the hotel business cut off unnecessary costs. In addition to this, business analytics helps to create a membership program and better tariff for loyal and frequently visiting customers. Using business analytics on feedback, hotel owners can improve and extend business at an appropriate time. Staff performance can also be evaluated through analytics to rate and increase salary. It helps increase competition among staff which leads to better performance. Business analytics helps to create revenue sources like restoring the highest rated food by customers depending on taste and quality

Limitations:

Lack of previous data available is a major drawback of writing the research paper on the impact of data analytics in the Bangladesh hotel industry. Beside this the survey questionnaire was provided to around 20 potential sample populations but only 10 respondents were interested and cooperated in the survey which implies the lack of interest and motivation to participate in the survey due to confidentiality issues. There is also not enough experience required in collecting primary data for which a certain risk is associated with the implementation of research methods and data analysis. As the sample size of this thesis paper is small, it is not possible to identify crucial relationships or connections within a particular data set through statistical tests and tools. There is a need for other researchers to continue and initiate the same study on a larger sample size to end up with more accurate results. Lastly, the depth and scope of discussions in different levels is not enough in this paper compared to scholars with a lot of expertise.

1.6 Layout of Study

Through this thesis paper the following steps will be covered:

1. Definition of topic
2. Criterion involved to complete the paper
3. Data collected from primary and secondary sources
4. Empirical Findings and Discussion relevant to topic
5. Data interpretation and analysis methods

II. LITERATURE REVIEW

In order to organize data and develop competitive strategy for cost effective hotel management and Business analytics is the extensive use of grounded in data mining and statistical analysis, usually in depth data and quantitative analysis to develop new insights and understand business performance (Chen et al., 2012; Davenport, 2010). Goes (2014) adds that analytics refers to the higher stages within the range of data-knowledge spectrum and is directly related to decision support systems of an organization.

Business analytics is “the generation of knowledge and intelligence to support decision making and strategic objectives” (Goes, 2014, p. vi). Business analytics represents the analytical component in business intelligence (Davenport, 2006) which implies that business analytics is a part of business intelligence. Various analytical tools are available such as whiteboard, Sisense, Dundas BI, Tableau, TIBCO Spotfire, Micro strategy and SAS Business Analytics. Functions within Business analytics are categorized into data collection, prediction of future events, business performance, text and data mining, benchmarking, predictive analysis, and reporting behaviour. There are basically 3 types of business analytics which are used at different stages for organizational development. The extension of types happened to meet different organizational needs but these 3 basic types are present everywhere. These are: a) Descriptive Analytics b) Diagnostic Analytics c) Predictive Analytics and d) Prescriptive Analytics. The activities that can be performed in hotels through business analytics are: Artificial Intelligence, Decision making, Data mining, Formulating marketing strategy, Forecasting customer needs, Building customer loyalty. The tourism sector is also data-hungry, this industry continuously requires to offer right information at the right time that allows businesses to acquire knowledge about customers, market trends, and buying behaviour (Cooper, 2006) and this in turn made hotel managers realize the importance of adapting to the changing business environment through adaption of different technologies not only to remain competitive, but also to survive (Magnini, Honeycutt, & Hodge, 2003). However, as there are many complexities associated with business analytics and Business Intelligence analyses, most hotel professionals have difficulty in understanding about these system capabilities, its functionalities and what value this technological involvement can contribute. Some newer applications of business analytics in operations seem like something out of a fiction movie in the top-rated hotel tourism industries. The featured capabilities include automation of whole operational process, facial identification, voice pattern recognition, real time conversation through chat bots, and real-time management of distributed applications (Bughin et al., 2016). Lau et al., (2012) developed a model that is novel due diligence balanced scoreboard which uses web intelligence (BI&A 2.0) techniques mentionable among them are business relation mining, domain-specific sentiment analysis and statistical learning to enhance the decision making which is related to global mergers and acquisition which is very much essential for an organizational development.

There is a dramatic increasing trend of investment in business analytics by different hospitality sectors. In fact, they are almost dependent on business analytics for effective decision making (Marcolin et al., 2019). Hotel managers are adapting to changing business environments and to cope with the growing competition business analytics is a must. For better understanding of customer demands and catering to those demands, text mining to extract information, valuable insights, and useful patterns are effective techniques for fast moving among mass competition.

There are also some challenges in the application of business analytics. The skilled personnel required for conducting such analysis is not available everywhere. The cost of using such analytical tools is comparatively higher if the data cannot be utilized properly. The information is highly confidential so if it gets to the wrong hand then all the efforts might go in vain. The inclusion of business analytics within full-service software technologies places additional burdens on all personnel on how to learn and integrate the full range of functions embedded within these systems (Rodrigues et al., 2020). The implementation expenses associated with time away from productive work in the form of downtime or training is high.

Business Intelligent applications generate broader and deeper demands that promote changes in service deployment and strategic management methods. This eventually results in the new emergence of the hospitality industry. The review focused on the value of analytical applications in the hospitality sector, indicating that the development can promote the change and betterment of the industrial growth pattern. It also shows the relationship between business analytics implementation success, organizational culture, and decision making.

III. RESEARCH METHODOLOGY

3.1 Research Type

This study can be described as a theoretical study. Theoretical study refers to the pure or basic research. The main emphasis in a theoretical study is to discover or establish the existence of a new general concepts through collection of data and combination of existing data for a better understanding of a particular field. Such as the aim of this study is to determine how business analytics creates an impact on decision-making and forecasting.

3.2 Sample Design

A simple random sampling technique has been used for this study. Since the size of the needed sample was below a few hundred and face-to-face contact was possible, a simple random sampling technique was deemed most suitable for this study.

3.3 Sample Size

In this study, the managers and employees who work with data or in the sales and marketing analytics department of three to five-star hotels were chosen as the sample. The questionnaire form was sent through e-mail to 10 hotels around Dhaka city. The study covers 10 hotels situated at various locations in Dhaka city. Most of the respondents here work in the sales and marketing department who constantly work on developing the service procedure through scrutinization of data monitored and collected. Some of them are in the decision-making role whereas others who integrally work with data pass the information to top level management. A few of them work in front office department who are also closely associated with client satisfaction and improvement of overall service. A typical hotel organizational chart is shown below:

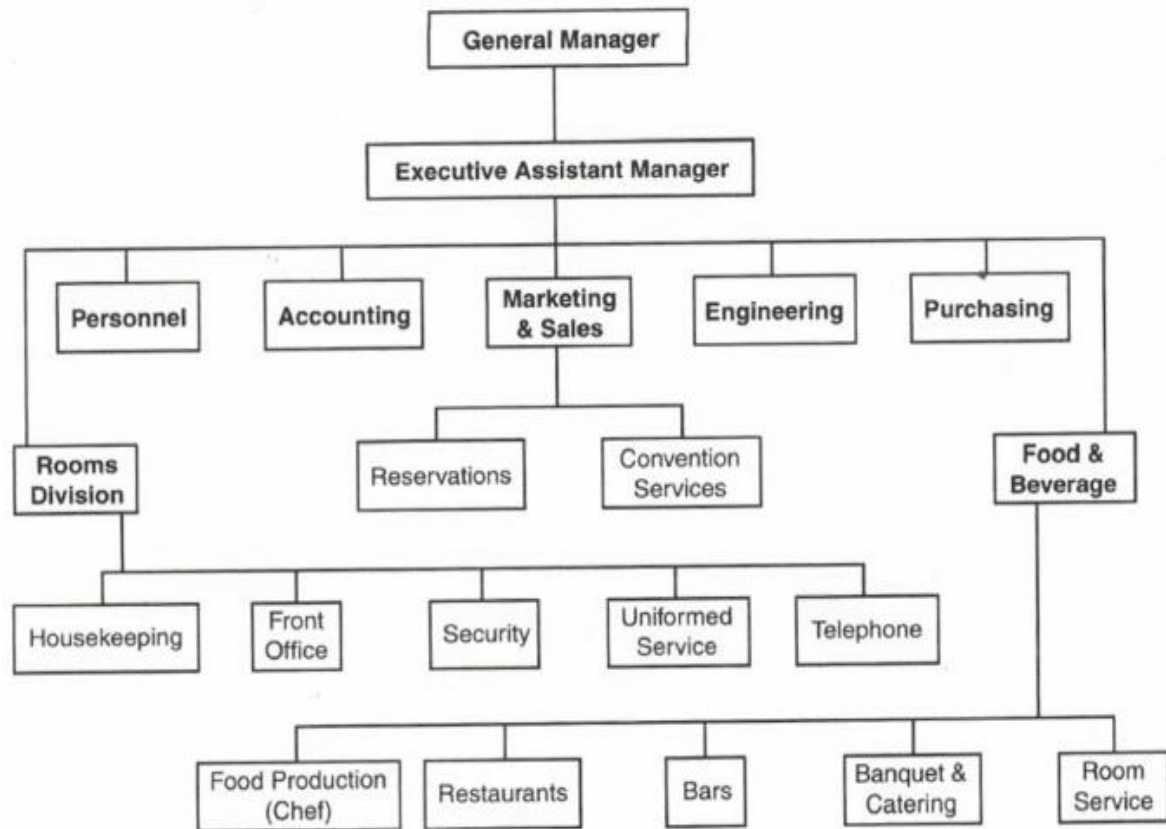


Figure 1: Hotel Organization Chart

As the 10 hotels chosen are among the 5 star hotels and fall within marriott international umbrella so this sample population represents the overall hotel condition of Bangladesh in terms of impacts business analytics can have in decision making and forecasting of overall hotel industry in Bangladesh.

3.4 Sources of Data

All the information integrated into this study has been taken from both primary and secondary sources.

3.4.1 Primary Data:

A questionnaire form has been used as the data collection tool of the research. The answers given to the questions have been taken with the help of a 5 points Likert-type scale. Most of the theoretical data has been gathered from previous studies of the relevant topic. Hotels and their representatives were surveyed using a questionnaire. An online survey is constructed and sent out to several hotels to obtain the data. Within two weeks, participants are asked to provide written replies, which are then compiled and analyzed for scholarly purposes. The participants in primary questionnaires and experimentation have been chosen without any biases to improve the quality of the data.

3.4.2 Secondary Data:

Secondary data are those data that has been already collected by other concerned party and is readily available from other sources. The secondary data required for this study were collected from the following sources:

1. Books
2. Internet
3. Newsletters and articles
4. Various brochures and leaflets

3.5 Research Questionnaire

As part of this research, a semi structured questionnaire was prepared to gather data from respondents. The questionnaire is designed personally as an integrated whole to serve the intention of this research with the questions flowing smoothly from one to another after a few introductory remarks and instructions for ease of entry and clarity. The survey questions provide a valid and reliable measure. The set of questionnaires is very clear and easy to understand avoiding any confusion related to ambiguity and confusion. Respondents will find it simpler to finish the survey and the results will be more exact as a result. There were 17 questions in total in the google form, filling this form up would add valuable insights to complete the thesis. The questions were in 2 sections. They were pretty basic like, "what sort of customer do you target and want to attract?", "which analytical tool do you mostly use for interpreting data?", etc. Following table contains the list of hotels that has been surveyed for data collection relevant to research. 10 of my respondents work at various managerial positions in different hotels.

Number of Respondents Surveyed 10

Go to Appendix A to view the table where names of hotels that are surveyed along with respondents' positions are given.

3.6 Data Analyzing Method

As data collection is done in semi structured format so the collected data is analyzed through two methods: Frequency Content analysis and Spreadsheet analysis. The questionnaire for data collection is in the form of multiple-choice survey question which involves forcing the respondent to choose just one answer from the list provided. The answer choices do not overlap and it is designed in such a manner that all respondents find relevant options. As the research is based on theoretical study so grounded theory-based analysis of the data will eventually lead to a better understanding of the different business analytics influencing success factors as well as the impact of business analytics in the hotel industry. A framework or model has been developed that not only captures major constructs of idea that span across industries, but also links these constructs of idea to the most essential elements of organizations: actionable business analytics that lead to increased performance through assisting in decision making and forecasting the future of an organization. The model has been illustrated in Appendix C below. The collected data for the research process is analyzed through the MS Excel process. To be precise spreadsheet analysis is done. Spreadsheet Analysis is a tool made in Excel that helps analyze data through percentage or portion to provide a clear picture of the whole scenario.

IV. EMPIRICAL FINDINGS

This chapter presents and discusses empirical findings and statements from the empirical study on different hotels. Collected data is analyzed and used to sample and illustrate related findings. A scrutiny of the text from the empirical study is done to identify information for the sub chapters. The completed analysis is shown in the following sections below.

4.1 Deployment of Business Analytics

The data resulting from our survey of people working in the managerial bodies in different hotel businesses provides valuable insights into the topic Impact of business analytics in decision making and forecasting: An empirical study on the hotel industry in Bangladesh. In my survey results, most of them target international customers. Some of them also target higher-class and middle-class customers. Only a few are interested in economic class customers. In addition to this, this survey also searched for the desired data collection method of different hotel organizations where about 60% of the organizations use both qualitative and quantitative methods to collect data. Another 30% of the organizations use only qualitative methods, and 10% use only quantitative methods to collect data. To interpret the data, 90% of organizations use MS Excel and only 10% of organizations use R Programming which implies that most organizations do not have proficiency and expertise on advanced analytical tools such as Python and Dexter. The duration for data collection and interpretation process usually takes between 20 to 60 days by different organizations which varies and differs according to specific goal and objective of organizations.

If we compare some elite hotels in a metropolitan city running in traditional ways, the increasing globalization may have hit it by now to initiate changes. The research explores information about experience and usage of business analytics in hotels. Many hotel organizations are in need of implementing sophisticated business analytics for various opportunities and organizational growth. To process relevant data, the following questions have been selected from interview questions used in the practical research, and the answers reviewed.

- Which function of your organization is fulfilled and what are the key determinants for interpreting collected data?
- How much do you agree that the application of business analytics helps in building brand equity in your organization?
- Which other business departments does business analytics integrate with and provide support?

Hotel businesses have realized how important it is to use business analytics in driving organizational growth and revenue. Through the above mentioned questions, it is possible to generate the need of business analytics and how it is associated with other departments of an organization. From the survey 6 out of 10 respondents see increment of customer base as one of the key functions of business analytics, other 3 respondents manipulate data mostly for logistical management of their organization. The key determinants for interpreting collected data for business expansion which will further assist organizations to flourish.

Around 70% of the respondents agree with the statement that business analytics helps in building brand equity of an organization and another 30% strongly agree with the statement. Through this it can be inferred that almost everyone of the sample size feels that business analytics is essential and should be implemented in organizational development. The value of organization also heightens in customers' perception of those who involve business analytics in organizational management.

9. How much do you agree that the application of business analytics help in building brand equity and support business management process of your organization?

10 responses

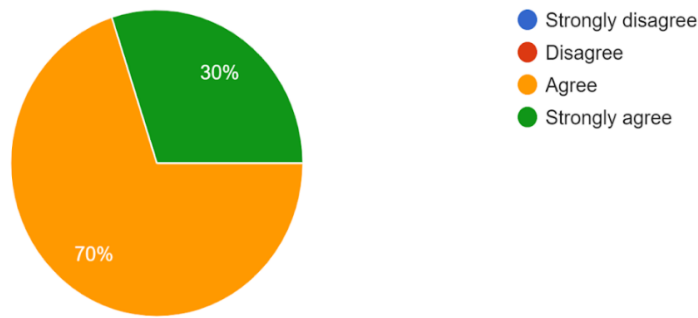


Figure 2: BA in brand equity and business management process

4.2 Business Analytics in Decision Making

The decision making quality enables a business to adapt more swiftly than its competitors to the opportunities and threats presented by the current age and the developments in its markets. Business Analytics is a mixture of techniques, technologies and applications used to scrutinize a corporation's data and performance to transpire data-driven decision-making analytics for the corporation's future direction and investment plans (Bayrak, 2015; Kristoffersen et al., 2021). It is possible to analyze performance and make decisions accordingly through looking at data from different dimensions which is only possible in business analytics. Business analytics aims to generate knowledge, understanding and learning collectively referred to as 'insight' to support evidence-based decision making and performance management.

There is a high impact of accommodation and hotel services on the tourism industry and its development in the near future. From the perspective of customer, the importance of previous reviews regarding hospitality for their decision-making process in the literature has been extensively demonstrated (Sparks & Browning, 2011; Ye, Law, & Gu, 2009). Business Analytics is often used to classify guests using varying factors such as behavior and business trends and demands in the hospitality industry. Through identifying the behavioral pattern, decisions are made accordingly. The hotel's most valuable guests, which in turn assist in focusing their loyalty to such guests can be determined with the help of descriptive analytics.

The questions that were asked to respondents to find out the sectors where decision making plays a significant role in the organization through the implementation of business analytics were:

- How does application of business intelligence assist in organizational development?
- How can business analytics be implemented for further organizational growth?

According to the respondents, almost 50% of hotels use or want to deploy business analytics for fast decision making. Other 30% are more interested and want to know about consumer behavior trends and patterns. From this it can be inferred that most hotel organizations are in dire need of faster and accurate decision making which can only be possible through the proper utilization of business analytics.

7. How does application of business intelligence assist in your organizational development?

10 responses

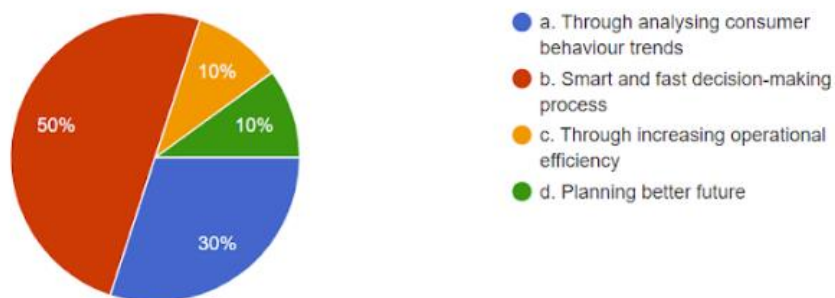


Figure 3: BA on Organizational Development

An open-ended question was made to comprehend the roles business analytics can play on further organizational growth and development. To summarize the respondents' viewpoints it can be stated that through tracking, processing, storing, analyzing and transforming data into insights it is possible to make better decisions in the organization. The ways it can be exercised for organizational growth may vary according to organizational type but proper planning and experience associated with it will ensure further development where business analytics can play a key determinant. Revenue & Expenses, Budget Forecasting, New Products/service management & data management are some other noteworthy contributions of business analytics in terms of

organizational growth for the next course of action to take place. Not only this, it also helps to conduct accurate market surveys and forecasting and meet organizational goals. Business analytics provide insight on present and historical data within the business context. Analysts can leverage data to provide performance and competitor benchmarks to make the organization run smoother and more efficiently.

4.3 Business Analytics in Forecasting

Hotels establishing intelligent business analytics have extraordinary methods for targeting personalization and predicting guest behavior and needs at an immensely deep level. The hotels surveyed involve business analytics methods and tools in predictive analytics and real-time forecasting that is eventually used to shape organizational goals and strategies. Their questions that were asked to receive and understand valuable insights regarding forecasting and predictive analytics are:

- Which of the following do you mostly forecast through business predictive analytics?
- How has predictive business analytics influenced your company’s brand/sales?
- Which of the following do you mostly forecast through business predictive analytics?
- How has predictive business analytics influenced your company’s brand/sales?
- Do you think business analytics provide efficient forecasts of future events? On a scale of 5 how would you rate it?

About 80% of respondents apply business analytics to predict occupancy rate of hotel rooms as this is one of the important criteria of earning revenue. Others feel it to be important to forecast pricing of room and hotel booking channels. So from this it can be inferred that for a hotel business if occupancy is good and the rate of bookings are fairly increasing business analytics can help automatically close out inventory making it cost effective(Kothari & Kothari, 2017). Data sources can be effectively used for setting pricing strategies and the channels that are widely popular for booking can also be found from this.

10. Which of the following do you mostly forecast through business predictive analytics?

10 responses

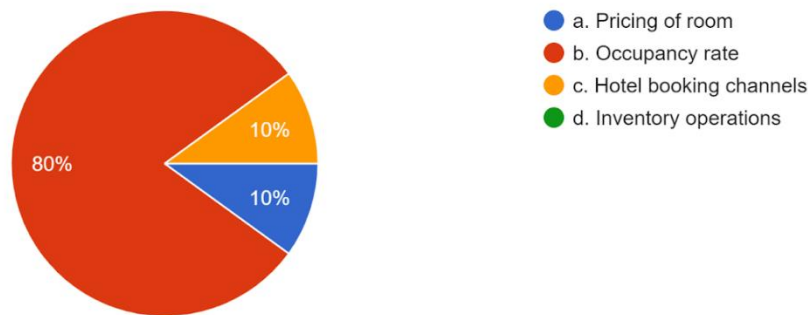


Figure 4: Usage of predictive business analytics

Business analytics has a considerable influence on a company's sale which is measured to be 40% at predicting accurate and proper segmentation of the market. On the other hand 30% of the respondents use business analytics to predict future need and demand of guests which is essential for smooth running of operations and generating revenues. Another 20% deploys predictive business analytics which assist in its' product/service development including performance of staffs and their behavior, redesigning food menu, interior features of hotels and rooms

11. How has predictive business analytics influenced your company’s brand/sales?

10 responses

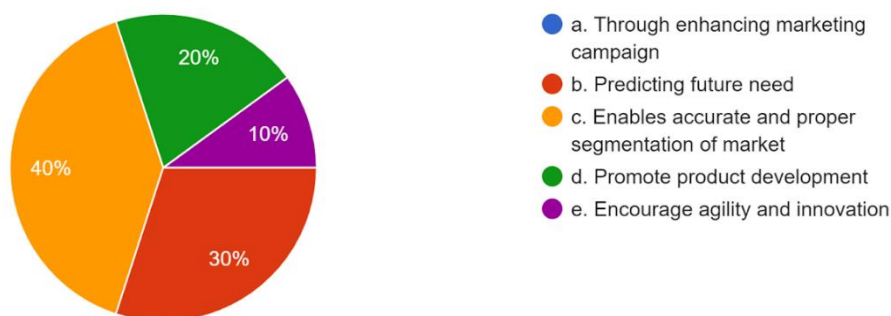


Figure 5: Impact of predictive business analytics on organization

9 out of 10 respondents rated 4 where they think that business analytics provide efficient forecasts of future needs. This implies that predictive business analytics plays a pivotal role in hotel organization.

V. DISCUSSION

Using business analytics for improved decision-making is of paramount importance to managers. If organizations are to create value from their data, data quality is absolutely essential which is to be addressed with utmost priority. Hence, a key starting point to obtain overall organizational buy-in is represented through creating a big data and analytics strategy (Vidgen, 2017). A global survey was conducted of 646 professionals, managers, and executives, some of the key benefits from using business analytics include increased productivity, reduced risks, reduced costs, faster decision-making, improved programs, and superior financial performance (Harvard Business Review Analytics Report, 2012). Entirely, findings show that the main focus for harnessing data is to understand the guest better and to meet organizational objectives that cater to the need of guests. An instance of a significant problem that BI methods help in solving is guest dissatisfaction by improving the quality of guest experience (Xiang et al., 2015). Findings show the contrary to be also true. The data collected through deployment of business analytics are verified through different procedures such as double data entry process, assigning operators to verify and built-in data capture programs. Without the help of these additional features it is not possible to accurately verify collected data.

5.1 Roles and Implications of Business Analytics

Jannach (2016) explains high demand for added Business Analytics features and roles have been recorded by most industrial applications and organizational platforms in the hotel tourism sector. So, to fulfil these high demands the application of analytical tools are must to further enhance the growth of organization. The improvement of organizational operation and processes and quality service delivery as a result of adopting right business analytics has led to the increase in demand for these systems. The insights received through data collection implies that business analytics can relate to customer demands, new upcoming market opportunities and trends, product suitability specifications, advertising impact and market competition. Ariyachandra & Watson (2006) analysed the critical success factors for business analytics implementation and found various determinants which are individual impacts, information quality, organizational impacts, individual impacts, and system quality that are the four key factors to determine whether an organization's analytical efforts are successful. On the other hand, Yeoh & Koronios (2010) classified business analytics success determinants into three categories that is the segment where implementations of business analytics have been successful namely technology-related success factors, process related success factors, and organizational success factors. Their organizational success factors included determinants such as a clear organizational vision, and a well-established business case (Yeoh & Koronios, 2010). So, these are basically the sector where business analytics play major roles and it's implications are necessary to make the roles fruitful.

5.2 Types of Business Analytics

There are different types of business analytics but the combination of the following creates the modality for better decision making and forecasting. Below are the different types of business analytics the combination of which are made and collaborated for making right decisions and predicting future events of an organization:

5.2.1 Descriptive Analytics

To use data and understand past and current business decisions and make fact-based decisions most business deploy descriptive analytics (Raghupathi & Raghupathi, 2021). Descriptive analytics summarize what has happened and establishes trend analysis and past performance from thresholds of transactions that are compared to benchmark which forms the basis of many continuous monitoring alert systems (Appelbaum et al., 2017). The two main techniques involved are data aggregation and data mining are two main techniques involved that is used purely for understanding the underlying behavior without making any estimations. After this part, a diagnostic is done to identify why that particular thing happened.

5.2.2 Diagnostic Analytics

To understand the root cause of events diagnostic analytics takes a deeper look at data. It focuses more on why something happened. This involves little bit of hypothesizing and more diverse data input. Diagnostic analytics mostly uses likelihood, probabilities, and the distribution of outcomes for the analysis of the data. It is helpful in determining what factors and events contributed to the outcome.

5.2.3 Predictive Analytics

The hotel industry has to generate massive amounts of data from business processes and user interaction within this sector which is why it is considered to be data-rich (Hsieh, 2009). In predictive analytics future performance can be predicted through any of the following ways: by detecting patterns or relationships within data, by examining historical or past business data and extrapolating these patterns of data to make an informed forecast (Raghupathi & Raghupathi, 2021). For detecting trends or predicting behavior hidden relationships and patterns among huge volumes of data are analyzed to segment them into meaningful sets.

5.2.4 Prescriptive Analytics

Prescriptive analytics tells what should be done in future which is associated with decision making of an organization. It provides recommendations for a course of action to take place. Using simulation and optimization, it advises on the possible outcomes and suggests actions that can maximize the key business metrics to meet organizational goals. This type of analytics uses a strong feedback system that establishes a relationship between action and outcome. Prescriptive analytics is deployed in business areas such as finance, marketing, supply chain management, customer relationship management, and others (Raghupathi & Raghupathi, 2021).

5.3 Organizational benefits derived from Business Analytics

To improve business performance an organization needs to get an analytical insight into a huge volume of data to apply big data and business (Shabbir & Gardezi, 2020). Big data analytics capability is broadly defined as the competence over others through providing business insights using data management, infrastructure (technology) and talent (personnel) capability to transform business into a competitive force (Kiron et al., 2014). If the achievement of different departments within the hospitality industry are analysed, it can be noticed that the efforts made technologically which use particular insights from the decision support system to support decision making processes within the business analytics framework are prominent. Similarly, when trying to predict the future product assumption within the hospitality industry then also the support of business analytics become crucial. Hence, organizational benefit from implementation of business analytics is huge. Concerned party from hotels can be able to learn about guest interests and demands to avail custom service through forecasting, which is achieved through business analytics applications.

5.4 Challenges associated with big data and business analytics

There are many concerns regarding the disposition of advanced business analytics and data that incorporate intelligent techniques studied by the literature. The businesses face various challenges from the wrong implementation of business analytics.

For structured and unstructured data in the tourism industry the global growth in use is raising the need to have components of deep learning and machine learning and business analytics tools (Zohuri & Moghaddam, 2020). However, there are challenges that emerge from business analytics and are prominent. Firstly, if organization wants to create value from data, data quality is absolutely essential and must be addressed. Secondly, using analytics for improved decision-making is of utmost importance to hotel managers. Finally, to obtain organizational development creating a big data and analytics strategy represents a key starting point. The findings show that the lack of having well designed business analytics and efficient usage of it limits the effective management and development of tourism services. Guest satisfaction cannot be ensured properly without employing data analytics in the organization. A fact is illustrated in the empirical study which implies that an unsatisfied guests have no interest in revisiting the hotel and are doubtful in doing so, resulting in a poor return on investments. According to Zohuri and Moghaddam (2020), creation of overloaded and tremendous sizes of data from day to day business processes due to growth in data requirement and data usage in hotel industries. Findings explain that it is not capable of handling such data structures without proper implementation of business analytics to build a robust and resilient organization of information and data generation for decision making and forecasting (Zohuri & Moghaddam, 2020). There is also a need for organizations skill sets for future in terms of challenges faced by them in building an analytics capability. A key challenge which is analytics skills shortage was identified to practitioners in the application of business analytics (Vidgen, R., 2017).

Challenges that demand real-time decisions to be made, for instance, chat bots having conversations with a client can be achieved through application of business analytics (Geisler, 2018). A huge concern within the hotel booking and accommodation sector is improper implementation of concepts and methods of business analytics since it limits support for proper decision making through limiting product and service suitability, poor assessment of customer demands, low and inadequate and low prediction of business processes, incomprehensible exploitation of the market, etc. According to a survey made by MIT Sloan Management Review along with IBM Institute of Business Value (LaValle, Lesser, Shockley, Hopkins, & Kruschwitz, 2011) revealed that “lack of understanding of how to use analytics to improve the business” is the leading and most prominent obstacle to widespread business analytics adoption. Findings have also shown when a hotel firm is unable to progress with the technological advances the representation the situation becomes fatal of which is exhibited below:

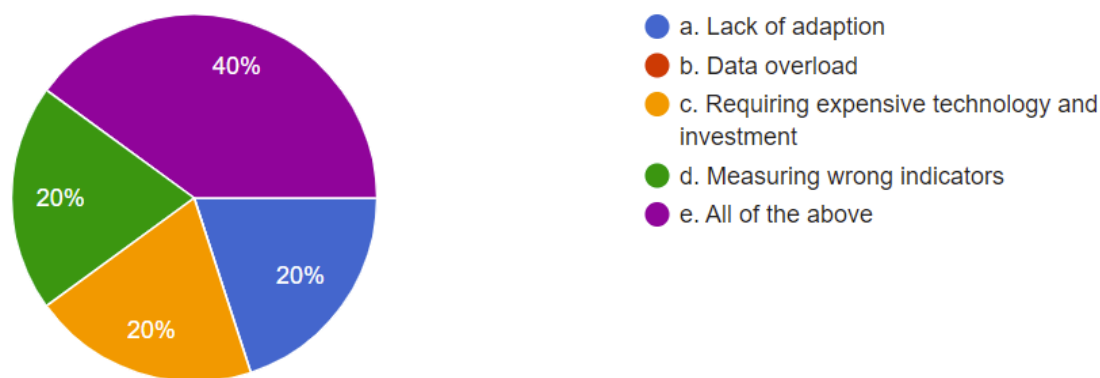


Figure 6: Problems associated with application of BA

A question was asked to respondents on specified problems they face while applying business analytics and there almost 40% of respondents agreed with all the problems mentioned in options which are requiring expensive technology and investment, managing loads of data, lack of adoption by professionals, measuring or identifying wrong parameters. So from this finding it can be understood that proper application and deployment of business analytics is necessary to efficiently utilize business analytics in an organization for decision making and forecasting.

The additional burdens that is being placed on all personnel on how to learn and integrate the full range of functions embedded within full services software technologies systems is a challenge to face (Rodrigues et al., 2020). The implementation expenses is also high that is associated with time away in the form of downtime from productive work.

Business Intelligent applications promote changes in service deployment to different organizational departments and strategic management methods which in turn generates broader and deeper demands. This eventually results in the new emergence of the hospitality industry. The paper tries to indicate the development can promote the change and betterment of the industrial growth

pattern through focusing on the value of analytical applications in the hospitality sector. It also shows the relationship between business analytics implementation success, organizational culture, and decision making.

VI. CONCLUSION AND FUTURE RESEARCH

The Hospitality Industry has never been more competitive. With the number of merchants on the increase, the customer is spoiled for choice. When you factor in the lack of distinction offered by hotels, the customer has a very low barrier to entry when making a transfer. As a result, hotels must go above and beyond standard ways to discover visitor patterns, pinpoint problem areas, then devise solutions that are timely and cost-effective. In the hotel sector, data analytics may be utilized in different ways to enhance company operations, marketing tactics, occupancy levels, and yield. For example, with analytics, the concierge may know which local excursions to propose that meet a guest's desire based on his prior behaviour. Predicting which menu items will be ordered depending on the local weather, for example, helps the restaurant department. It helps the reservation staff to forecast the appropriate pricing for a room. It helps the sales and marketing team to build and deploy personalized messages across multiple networks. Analytics can also assist hotels in reducing their energy expenditures while maintaining the same level of service for their guests. As the world becomes more interconnected, we must adapt and change our business plans to keep up, even if just a little amount of data might have a significant influence. Therefore, with the vast amount of data accessible in the hospitality business, all the organizations are approaching the products and techniques to make the best of most of their data.

Using business analytics becomes complicated and it makes it difficult to extract the actual results. Many hotel businesses try to use business analytics, totally new systems, to the old approaches. That makes the process more difficult. In Bangladesh, many hotels rely on defective, error-proof, or incomplete data that result in poor quality business analytics. Planting a new system requires more investment in infrastructure and maintenance that many business owners like to avoid.

For future research there is a need to apply appropriate types of generalizability (not just statistical) to move forward with this particular type of study. According to Parks et al. (2017) Future studies in this field of study must show further applications of business analytics in anticipating such abilities as to forecast guest demand and control a guest's room facilities. It is reasonable to assume that the insights gained from the framework provided in this paper will guide future researchers to develop a more formal theory in this area (Orlikowski, 1993). Large scale additional data collection is required to further sharpen the findings in this study. Findings show that business analytics is extremely important in an organization but there is a lack of technology and skilled professionals to run the process. Doing further research could facilitate the organization in achieving better decision making. Future examinations should also consider explaining various advances made on business analytics and other materials presented in this study.

VII. REFERENCES

- [1] Appelbaum, D., Kogan, A., Vasarhelyi, M., & Yan, Z. (2017). Impact of business analytics and enterprise systems on managerial accounting. *International Journal Of Accounting Information Systems*, 25, 29-44.
- [2] Ariyachandra, T., & Watson, H. (2006). Which data warehouse architecture is most successful? *Business Intelligence Journal*, 11(1), 4.
- [3] Bayrak, T. (2015). A review of business analytics: A business enabler or another passing fad. *Procedia-Social and Behavioral Sciences*, 195, 230-239
- [4] Chen, Chiang, & Storey. (2012). Business Intelligence and Analytics: From Big Data to Big Impact. *MIS Quarterly*, 36(4), 1165.
- [5] Cooper, C. (2006). Knowledge management and tourism. *Annals of Tourism Research*, 33(1), 47-64.
- [6] Davenport, T. H. (2006). Competing on Analytics. *Harvard Business Review*, 84(1), 98-107.
- [7] Geisler, R., 2018. Artificial Intelligence in the Travel & Tourism industry: Adoption and impact.
- [8] Ghorapade, M. (2018). Business Analytics and It's Impact on Business and Industry. *International Journal Of Trend In Scientific Research And Development, Special Issue(Special Issue-ICDEBI2018)*, 74-79.
- [9] Goes, P. B. (2014). Big Data and IS Research. *MIS Quarterly*, 38(3), pp. iii-viii.
- [10] Harvard Business Review Analytics Report. (2012). The Evolution of Decision Making: How Leading Organizations Are Adopting a Data-Driven Culture.
- [11] Jannach, D., 2016. Big data for travel and tourism recommender systems: a position statement. In: *Big Data and Business Intelligence in the Travel and Tourism Industry*. Östersund: Mid Sweden University, pp. 93-110.
- [12] Kiron, D., Prentice, P.K., Ferguson, R.B., 2014. The analytics mandate. *MIT Sloan management review* 55, 1-25
- [13] Kothari, D., & Kothari, A. (2017). Business Analytics in Hospitality Industry. *International Journal Of Innovative And Emerging Research In Engineering*, 4(9).
- [14] Lau, R. Y., Liao, S. S., Wong, K. F., & Chiu, D. K. (2012). Web 2.0 environmental scanning and adaptive decision support for business mergers and acquisitions. *MIS Quarterly*, 36(4), 1239-1268.
- [15] LaValle, S., Lesser, E., Shockley, R., Hopkins, M. S. & Kruschwitz, N. (2011). Big Data, Analytics and the Path from Insights to Value. *MIT Sloan Management Review*, 52(2), 21- 31.
- [16] Magnini, V. P., Honeycutt, E. D., & Hodge, S. K. (2003). Data Mining for Hotel Firms: Use and Limitations. *The Cornell Hotel and Restaurant Administration Quarterly*, 44(2), 94-105.
- [17] Marcolin, C., Becker, J., Wild, F., Schiavi, G., & Behr, A. (2019). Business Analytics in Tourism: Uncovering Knowledge from Crowds. *BAR - Brazilian Administration Review*, 16(2).
- [18] Master. NOVA – School of Business and Economics.
- [19] Orlikowski, W. J. (1993). CASE Tools as Organizational Change: Investigating Incremental and Radical Changes in Systems Development. *MIS Quarterly*, 17(3), 309- 340.

- [20] Parks, F.R., Thambusamy, R. (2017). Understanding Business Analytics Success and Impact: A Qualitative Study. *Information Systems Education Journal*, 15(6), 43-55
- [21] Raghupathi, W., & Raghupathi, V. (2021). Contemporary Business Analytics: An Overview. *Data*, 6(8), 86.
- [22] Rodrigues, J., Sousa, M., & Brochado, A. (2020). A Systematic Literature Review on Hospitality Analytics. *International Journal Of Business Intelligence Research*, 11(2), 47-55.
- [23] Shabbir, M., & Gardezi, S. (2020). Application of big data analytics and organizational performance: the mediating role of knowledge management practices. *Journal Of Big Data*, 7(1).
- [24] Sparks, B. A., & Browning, V. (2011). The impact of online reviews on hotel booking intentions and perception of trust. *Tourism Management*, 32(6), 1310-1323.
- [25] Vidgen, R., Shaw, S., & Grant, D. (2017). Management challenges in creating value from business analytics. *European Journal Of Operational Research*, 261(2), 626-639.
- [26] Wilson, A. (2016). Big-Data Analytics for Predictive Maintenance Modeling: Challenges and Opportunities. *Journal Of Petroleum Technology*, 68(10), 71-72.
- [27] Xiang, Z., Schwartz, Z., Gerdes, J. H., and Uysal, M., 2015. What can big data and text analytics tell us about hotel guest experience and satisfaction? *International Journal of Hospitality Management*, 44, pp. 120-130.
- [28] Yeoh, W., & Koronios, A. (2010). Critical success factors for business intelligence systems. *Journal of computer information systems*, 50(3), 23-32.
- [29] Zohuri, B. and Moghaddam, M., 2020. From Business Intelligence to Artificial Intelligence. *Modern Approaches on Material Science*, 2(3), pp. 231-240

Appendix A

Survey Questionnaire

1. **What sort of customer do you target and want to attract?**
 - a. Higher class
 - b. Middle class
 - c. International/global clients
 - d. Economic class/thrifty clients
2. **What is your data collection method?**
 - a. Quantitative Method
 - b. Qualitative Method
 - c. Both
3. **Which analytical tool do you mostly use for interpreting data?**
 - a. MS Excel
 - b. Python
 - c. R Programming
 - d. Tableau Public
4. **Which function of your organization is fulfilled and what are the key determinant for interpreting collected data?**
 - a. To increase customer base
 - b. For business expansion
 - c. Logistical management
 - d. Advanced technological development
 - e. For research purpose
 - f. For analysing current economic process
 - g. For risk management
 - h. For forecasting business condition
5. **Which of the following sources do you rely for mass collection of qualitative data?**
 - a. Questionnaire
 - b. In depth interview
 - c. Focused Group Discussion
 - d. Experimentation and Observation
6. **What is the ideal length of time to complete the data collection and interpretation process?**
 - a. 20 days
 - b. 40 days
 - c. 60 days
 - d. 80 days or more
7. **How does application of business intelligence assist in organizational development?**
 - a. Through analysing consumer behaviour trends
 - b. Smart and fast decision-making process
 - c. Through increasing operational efficiency
 - d. Planning better future
 - e. All of the above
8. **What are the ways of verifying the data collected through business intelligence?**

- a. Double data entry process
 b. Built in data capture programs
 c. Assigning operators for rechecking
 d. All of the above
9. *How much do you agree that the application of business analytics help in building brand equity in your organization?*
 a. Strongly agree
 b. Somewhat agree
 c. Disagree
 d. Strongly disagree
10. *Which of the following do you mostly forecast through business predictive analytics?*
 a. Pricing of room
 b. Occupancy rate
 c. Hotel booking channels
 d. Inventory operations
11. *How has predictive business analytics influenced your company's brand/sales?*
 a. Through enhancing marketing campaign
 b. Predicting future need
 c. Enables accurate and proper segmentation of market
 d. Promote product development
 e. Encourage agility and innovation
12. *Do you think business analytics provide efficient forecast of future events? On a scale of 5 how would you rate it?*
13. *Which other business departments does business analytics integrate with and provide support?*
 a. Logistics
 b. Strategic development
 c. Technological development
 d. Customer service
 e. Sales
 f. All of the above
14. *What is the problem associated with application of business analytics that your organization faced?*
 a. Lack of adaption
 b. Data overload
 c. Requiring expensive technology and investment
 d. Measuring wrong indicators
 e. All of the above
15. *How can business analytics be implemented for further organizational growth? Give a brief description.*

Appendix B

Table A: List of Hotels Surveyed

SL NO	HOTEL NAME	RESPONDENTS POSITION	WORK RESPONSIBILITIES
1	Pan Pacific Sonargaon Dhaka	Senior Sales Officer	Improving current sales strategies through maintaining liaison with customers and clients
2	Dhaka Regency Hotel & Resort Ltd	Head of Sales & Marketing	Generating sales plan and developing pricing and marketing strategies
3	Best Western Plus Mapleleaf Hotels	Senior Guest Relation officer	Supervising day to day operations and offering services to customers

4	Le meridien dhaka	Telesales member	Talking to potential customers on the phone to sell products or solicit donations
5	The Westin Dhaka	Cluster Assistant Manager	Managing and resolving complex operational issues that arise across clustered area
6	DOREEN HOTELS and Resorts Ltd	Credit Manager	Granting credit process, bill collection, including the consistent application of a credit policy
7	Inter Continental Dhaka	Sales Executive	Assist in increasing the sales number
8	Renaissance Dhaka Gulshan Hotel	Credit Incharge	Managing organization's cash flow, day to day credit activities
9	Radisson Blu Dhaka Water Garden	Director of Sales and Marketing	Generating sales plan and developing pricing and marketing strategies
10	Amari Dhaka	Sales Manager	Assist in increasing the sales number and coordinating activities with other departments

Appendix C

Business Analytics Impact Process

