DRIVING OPERATIONAL EFFICIENCY THROUGH BUSINESS ANALYTICS - A STUDY AMONG BUSINESS ENTERPRISES

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"Intelligence is what you have and analytics is what you do with it."

ABSTRACT

Business Intelligence is essentially timely, accurate, high value and actionable business insights and the work processes and technologies used to obtain them. It is all about making dry figures accessible and useful to the right audience within an enterprises. Intelligent Data insights empower the end users to be a lot closer to the results of the business. Data analytics in business can turn raw information into valuable inputs to increase the value of the data in making decisions. Now more than ever the need for business analytics has grown, as business analytics has recently evolved into an increasingly sophisticated collection of methods and tools using extensive data automation. Business analytics was previously only utilized by a few companies associated with the largest MNCs. The initial applications for corporate computing included creating reports, delivering presentations and entering data into applications such as Microsoft Excel.

After the evolution of business analytics, it is now integrated into various applications that deal with supply chain management, customer relationship management, human resources management, financial management manufacturing and creating clever strategies for sports too. Adoption of the Business analytics ecosystem brings a wide changes including informing industry trends, guiding academic research agendas and shaping policy discussions related to data-driven decision-making and organizational transformation.

Keywords: BI, Business Analytics, industrial change, business growth, data analytics, tools used, etc.,

Introduction

"Knowledge is having the right answer. Intelligence is asking the right question"

Business analytics plays a crucial role in modern business enterprises by leveraging data to drive informed decision-making. It involves the use of statistical analysis, predictive modeling, and data mining techniques to extract insights and inform strategic actions. Business analytics offers numerous advantages to modern enterprises, empowering them to unlock the full potential of their data and drive informed decision-making. It provides organizations with a competitive advantage in the marketplace. By leveraging data analytics to understand customer preferences, market trends and competitor activities, organizations can identify opportunities for differentiation and strategic positioning. This enables them to stay ahead of the competition, respond quickly to market changes and capitalize on emerging opportunities, ultimately driving business growth and

profitability. This allows decision-makers to make informed choices based on empirical evidence rather than intuition or guesswork, leading to more accurate and effective decision-making. Through data on Key Performance Indicators (KPIs) and business processes, organizations can identify areas for improvement, implement targeted interventions and measure the impact of initiatives over time.

Business analytics helps organizations optimize their operations and resource utilization for maximum efficiency and productivity. By analyzing data on processes, workflows and performance metrics, organizations can identify bottlenecks, streamline operations and improve resource allocation. This leads to cost savings, improved productivity and enhanced operational excellence, ultimately driving business success. By collection of customer data from various touch points such as sales transactions, website interactions and social media engagement, organizations can gain insights into customer preferences, behaviors and needs. With data on market dynamics, competitor offerings and customer feedback, organizations can identify opportunities for new product development, enhancements and differentiation.

USEFULNESS OF BUSINESS ANALYTICS

Business analytics serves as a critical tool for informing decision-making processes across all levels of an organization. In the era of data-driven decision-making, the implementation of business analytics has become imperative for organizations aiming to stay competitive and drive growth. By analyzing data from various sources such as sales, marketing, finance and operations, organizations can gain insights into their performance, market trends and customer behavior. The usefulness of implementing business analytics in various forms of organization are as follows

- Informing Decision-Making
- Predictive Insights
- Optimizing Operations
- Customer Insights
- Risk Management
- Strategic Planning

AREAS OF APPLICATION OF BUSINESS ANALYTICS

Business analytics is like data analytics but is focused exclusively on the business needs and efficiency of every business process. This type of analysis helps companies understand how they're doing in the marketplace and how they can increase their efficiency. The various fields of application of Business Analytics are given in the below Figure1.

FIGURE 1

AREAS OF BUSINESS ANALYTICS

MARKETING	• Analyze consumer behavior, segment customers and personalize marketing campaigns. • Understanding customer preferences, optimizing advertising strategies and measuring the effectiveness of marketing efforts.
OPERATIONS MANAGEMENT	• Optimize supply chain management, improve inventory management and enhance production processes • Forecasting demand, reducing operational costs and improving overall efficiency.
FINANCE	• Risk management, fraud detection and financial forecasting. • Assessing credit risk, identifying fraudulent transactions and making data-driven investment decisions.
HUMAN RESOURCES	• Talent acquisition, employee engagement and performance management. • It helps in identifying top talent, predicting employee turnover and optimizing workforce planning.
CUSTOMER SERVICE	• analyze customer feedback, track service performance and improve customer satisfaction. • helps in identifying trends, addressing customer complaints and delivering personalized customer experiences
BUSINESS STRATEGY	• Inform strategic decision-making by providing insights into market trends, competitor analysis and business performance. • Identifying growth opportunities, mitigating risks, and aligning business strategies with organizational goals.
RETAIL	• Inventory optimization, pricing strategies and customer segmentation. • Understand consumer behavior, optimize product assortments and personalize shopping experiences.
HEALTHCARE	• Patient care management, resource allocation and clinical decision support. • Identifying patterns in patient data, optimizing treatment plans and improving healthcare outcomes.
TELECOMMUNICATION	• Network optimization, customer churn prediction and service quality management. • Improving network performance, retaining customers and delivering better service experiences.
HOSPITALITY	• Revenue management, customer segmentation and personalized guest experiences. • It helps in optimizing pricing strategies, understanding guest preferences and maximizing occupancy rates.

OPPORTUNITIES IN BUSINESS ANALYTICS

Business analytics enables organizations to make strategic decisions based on data-driven insights rather than intuition or guesswork. By analyzing data on market trends, customer behavior and competitor activities, organizations can identify opportunities for growth, innovation and strategic differentiation. **Strategic Decision-Making** empowers decision-makers to make informed choices that align with the organization's goals and objectives, driving sustainable business success. Business analytics enables organizations to gain a deeper understanding of customer preferences, needs and behaviors. **Enhanced Customer Experience** leads to improved customer satisfaction, loyalty, and advocacy, ultimately driving business growth and profitability.

Business analytics helps organizations optimize their operations and resource utilization for maximum efficiency and productivity. For **Operational Efficiency,** Predictive analytics also enables organizations to forecast demand, manage inventory levels and minimize waste, leading to cost savings and operational excellence.

Business analytics facilitates innovation and product development by providing insights into market needs, consumer preferences and emerging trends. **Innovation and Product Development** enables organizations to stay ahead of the competition, drive innovation and capitalize on emerging market trends. Business analytics helps organizations identify and mitigate risks across various aspects of their operations. **Risk Management** is possible by analyzing historical data, market trends and external factors, organizations can identify potential risks such as market volatility, supply chain disruptions or regulatory changes. Predictive analytics also enables organizations to forecast future risks and take proactive measures to mitigate them, minimizing exposure and protecting the organization's reputation and bottom line.

Business analytics enables organizations to identify opportunities for revenue growth and profitability through data-driven insights. This leads to **increased profitability and sustainable business growth** in the long run. Business analytics facilitates continuous improvement by providing organizations with actionable insights and performance metrics. **Continuous Improvement** enables organizations to drive continuous improvement across all aspects of their operations, leading to increased efficiency, productivity and competitiveness.

CHALLENGES IN IMPLEMENTING BUSINESS ANALYTICS

While business analytics offers numerous benefits to modern enterprises, its implementation comes with several challenges that organizations need to navigate effectively.

Data Quality and Integration: Organizations often deal with data that is incomplete, inaccurate or inconsistent, making it challenging to derive meaningful insights. Ensuring data quality and integrating data from various sources requires robust data governance processes and investments in data cleansing and integration technologies.

Data Privacy and Security: With the increasing volume of data being collected and analyzed, data privacy and security have become major concerns for organizations. Safeguarding sensitive data and ensuring compliance with data privacy regulations such as GDPR and CCPA is essential.

Skills and Talent Gap: Building a team with the necessary skills and expertise in business analytics is another challenge for organizations. Data scientists, analysts and statisticians with proficiency in analytics tools and techniques such as Python, R, SQL and machine learning are in high demand but limited supply.

Change Management and Cultural Adoption: Implementing business analytics often requires a cultural shift within organizations. Resistance to change, lack of buy-in from key stakeholders and organizational silos can hinder the adoption of analytics-driven decision-making.

Infrastructure and Technology: Building and maintaining the infrastructure and technology required for business analytics can be resource-intensive. Organizations need to invest in scalable and robust IT infrastructure, analytics platforms and tools to support the collection, storage, processing and analysis of large volumes of data in real-time.

Complexity and Interpretation: The complexity of analytics models and the interpretation of results pose challenges for organizations, especially those without a strong analytical background. Understanding and interpreting complex analytics models and algorithms require specialized skills and domain expertise.

Cost and ROI: Implementing business analytics involves significant upfront costs, including investments in technology, infrastructure, talent, and training. Calculating the return on investment (ROI) of analytics initiatives can be challenging, especially in the absence of tangible metrics or benchmarks.

STATEMENT OF THE PROBLEM

Business analytics is instrumental in financial planning and forecasting by providing insights into financial performance, revenue projections and cost analysis. It is increasingly being used in human resource management to optimize workforce planning, talent acquisition and employee engagement. It helps organizations identify and mitigate risks across various aspects of their operations. Implementing robust data security measures, encryption techniques and access controls to protect sensitive information from unauthorized access or breaches is crucial for maintaining trust and credibility. Organizations need to invest in training and upskilling their workforce or partnering with external vendors to bridge the skills gap and build a capable analytics team. Though it is of much needed in any organization, it has some challenges to be met. Hence there arises the need to study how implementation of business analytics increased the operational efficiency and faces the challenges in which it is implemented.

LITERATURE REVIEW

This study draws its framework from the knowledge-based view (KBV) of the firm, first theorized by Grant (1996) and extended by Kaplan et al. (2001). According to this theory, knowledge is the most significant intangible resource of a firm. It proposes a model that relates knowledge with the firm's capabilities by which it increases organizational performance. Such knowledge can be taken from internal and external sources. It also perceives the firm's resources

as the key factors in its performance, thus suggesting that management should focus on harnessing internal capacities and capabilities rather than cogitating on external factors over which the firm has no control. Proponents of this view argue that organizations should focus on the inner strength of the company for its competitive advantage instead of comparing themselves with the competition. It is the knowledge that is the source of organizational performance (Wickramasinghe & Lubitz, 2007).

The importance of BA and BI in improving corporate and organizational performance is well acknowledged in the literature (Wixom et al., 2013). Several pieces of literature provide evidence of a relationship between BI, BA, and organizational performance. Price optimization and profit maximization are found to be outputs of comprehensive business intelligence (Davenport & Harris, 2007; Schroeck et al., 2012). Sales, profitability, and market share are greatly affected by analytics implementation (Manyika et al., 2011). Aydiner et al. (2018) found that business analytics capabilities generating business intelligence affect the overall business performance of the firm. According to Wixom et al. (2013), BI can increase performance by increasing productivity, which has both concrete (i.e., reduced paper reporting) and intangible (i.e., improved business reputation) benefits.

RESEARCH METHODOLOGY

Analytical Research method is used for the study. Convenience sampling method is adopted for selection of sample. The **primary data** was collected using Google forms based on a well-structured questionnaire and it was circulated to nearly 120 employees who work under various sectors of organizations which adopts Business Analytics in their concerns. Though it was circulated to 120 respondents only **93 respondents** have responded and hence the sample size selected for the study is 93.

FINDINGS OF THE STUDY
The various findings of the study are

- It is revealed from the study that 74% of the respondents are Male and 26% are female.
- From the analysis, it is interpreted that 35% of the respondents are between 26 to 35 years, 29% of them are between 36 to 45 years, 19% are below 25 years and 16% are above 46 years.
- It is known from the study that, 18% of the respondents are data analyst,16% are data governance manager, 15% of them are visualization specialist and business intelligence engineers respectively, 13% are business intelligence analyst and BI architect respectively and 10% of them are data quality analyst.
- It is found that, 45% of the respondents monthly income between Rs. 75,001 to Rs. 1,50,000, 30% of them earn below Rs. 75,000 and 25% are earning above Rs. 1,50,001.

- It is vivid that, 45% are working in a medium scale organization, 32% are working in large scale organization and 23% of them are working in a small scale organization.
- With regard to the level of investment made by the concern towards implementing of Business Analytics, 44% of them have invested moderate amount, 29% of them significant investment and 27% of them limited investment.
- Since the respondents have chosen more than one option, the number of responses is more than the sample size. 22% of the uses Microsoft Excel, 14% of them uses SQL(Structured Query Language), 13% of them uses python and Tableau respectively, 12% of them uses IBM SPSS Statistics, 8% of them used Power BI, 6% of them uses R and Google analytics respectively, 5% of them uses SAS (Statistical Analysis System) and 2% of them uses Apache Hadloop.
- It is evident that, the primary goal of implementing is to improve decision-making (30%), enhance operational efficiency (24%) understand customer behavior (18%), mitigating risk (17%) and Drive innovation (11%).
- Twenty three percent of the organization adopts business analytics in the area of Marketing and sales, 19% of them adopts in CRM, 17% in the area of HRM, 16% in Operations and supply chain management,14% in the area of financial planning and forecasting and 11% of them in the area of risk management.
- Among the various metrics used to measure the success of the business analytics initiatives, 25% of organizations have improved decision making, 19% of them improved in cost savings and efficiency gains, 17% of them enhanced customer satisfaction & loyalty, 16% Increase in revenue and profitability, 12% of them have attained Employee satisfaction and retention and 11% of them have found reduction in risks and vulnerabilities.
- It is known that, 33% of the respondents expects longer than 2 years for seeing the tangible results from business analytics initiatives, 27% within one year, 25% within 2 years and 15% within 6 months.
- It is clear that, 35% of the respondents utilize internal transactional data as their data source, 26% uses social media data, 22% uses customer data (eg: demographic, behavior) and 17% uses market research data.

TABLE 1
FINDINGS OF THE STUDY

How do you plan to ensure data privacy and security while implementing business analytics in your organization?		
	No. of respondents	%
Implementing data encryption techniques	38	41
Establishing strict access controls	27	29
Complying with data protection regulations (e.g., GDPR, CCPA)	19	20
Regular security audits and assessments	9	10
TOTAL	**93**	**100**
How do you plan to ensure the successful adoption of business analytics across your organization?		
Leadership support and buy-in	28	30
Employee training and education	31	33
Creating a data-driven culture	11	12
Aligning analytics initiatives with business goals	17	18

Providing adequate resources and support	6	6
TOTAL	**93**	**100**
How do you plan to communicate the value and benefits of business analytics to key stakeholders within your organization?		
Presenting case studies and success stories	14	15
Providing training sessions and workshops	35	38
Creating informative materials (e.g., whitepapers, presentations)	24	26
Engaging in one-on-one discussions & demonstrations	20	22
TOTAL	**93**	**100**
What potential barriers or obstacles do you foresee in the successful implementation of business analytics in your organization?		
Resistance to change from employees	33	35
Lack of support from senior management	14	15
Budget constraints	19	20
Technical limitations	21	23
Integration challenges with existing systems	6	6
TOTAL	**93**	**100**
How do you plan to involve and engage employees across different departments in the implementation of business analytics?		
Establishing cross-functional teams	12	13
Providing department-specific training and support	40	43
Encouraging feedback and participation in the process	26	28
Recognizing and rewarding contributions	15	16
TOTAL	**93**	**100**
How do you plan to address the skills gap in your organization related to business analytics?		
Hiring specialized talent	37	40
Training and upskilling existing workforce	34	37
Outsourcing analytics functions	22	24
TOTAL	**93**	**100**

TOOLS USED

- Ranking Method – WAM
- Chi-square
- Factor Analysis

RESULTS

The respondents made the **ranking** for the challenges that the organizations anticipate in implementing business analytics in their concern and the finding are as to Data privacy and security occupies first rank (5.73), Data quality and integration (5.04) with second rank, skills and talent gap (4.98) with third rank, infrastructure and technology (4.56) with fourth rank, change in

management & cultural adoption (3.68)with fifth rank, complexity and interpretation of results (3.35) with sixth rank and Cost and ROI considerations(3.23) with seventh rank.

HYPOTHESIS

Ho: There is a relationship between the level of investment of organization and addressing the skill gap among employees.

Ha: There is no relationship between the level of investment of organization and addressing the skill gap among employees.

The degree of Freedom will be (r-1) (c-1) = (2-1) (3-1) = 2

Level of Significance is 5.991

The calculated value is 0.375 **is less than the critical value**, the null hypothesis cannot be rejected. Hence there is a relationship between the level of investment of organization and addressing the skill gap among employees.

FACTOR ANALYSIS

The purpose of factor analysis is to reduce many individual items into a fewer number of dimensions. Factor analysis can be used to simplify data, such as reducing the number of variables in regression models. Most often, factors are rotated after extraction.

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.952
Bartlett's Test of Sphericity	Approx. Chi-Square	4474.849
	df	171
	Sig.	.000

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	17.764	93.496	93.496	17.764	93.496	93.496
2	.285	1.501	94.996			
3	.210	1.104	96.100			
4	.137	.719	96.818			
5	.117	.616	97.435			
6	.098	.518	97.953			
7	.072	.380	98.332			
8	.062	.324	98.656			
9	.051	.268	98.924			
10	.045	.238	99.162			
11	.036	.188	99.350			
12	.029	.152	99.502			
13	.022	.116	99.617			

14	.019	.098	99.715			
15	.015	.081	99.797			
16	.012	.061	99.858			
17	.011	.058	99.916			
18	.008	.045	99.960			
19	.008	.040	100.000			

Extraction Method: Principal Component Analysis.

The above factors were given under five headings as to satisfaction of employees, challenges faced, Progress of the concern, Role of external members and Effectiveness.

The Eigen value of factor 3 is 5. 086 with 29.241% of variance. The variables related to Factor 3 variables are improved decision making, level of involvement, Effectiveness on implementation and availability of resources.

CONCLUSION

The importance of business analytics in modern enterprises cannot be overstated. From gaining insights into operations and customer behavior to anticipating future trends and optimizing resources, business analytics is essential for driving informed decision-making and achieving competitive advantage in today's business environment. By leveraging data and analytics, organizations can unlock valuable insights that drive business growth, innovation, and success. . Effective change management strategies, leadership support and fostering a data-driven culture are essential for driving successful adoption of business analytics across the organization.

REFERENCE

1. Ashrafi, A., Ravasan, A.Z., Trkman, P., & Afshari, S. (2019). The role of business analytics capabilities in bolstering firms' agility and performance. International Journal of Information Management, 47, 1-15, https://doi.org/10.1016/j.ijinfomgt.2018.12.005.

2. Barney, J. (1991). Firm resources and sustained competitive advantage. Journal of Management, 17(1), 99-120. https://doi.org/10.1177/014920639101700108

3. Côrte-Real, N., Oliveira, T., & Ruivo, P. (2017). Assessing business value of big data analytics in European firms. Journal of Business Research, 70, 379–390. https://doi.org/10.1016/j.jbusres.2016.08.011

4. Delen, D., & Zolbanin, H. M. (2018). The analytics paradigm in business research. Journal of Business Research, 90, 186–195. https://doi.org/10.1016/j.jbusres.2018.05.013

5. Tan, K. H. (2018). Managerial perspectives of big data analytics capability towards product innovation. Strategic Direction, 34(8), 33–35. https://doi.org/10.1108/sd-06-2018-0134