Impact of Big Data Analytics &Business Intelligent System on Organization Performance of Private and Public Sector Organizations in India

[1]Priyanka Sharma,
Research Scholar, Faculty of Computer Science, Pacific Academy of Higher Education and Research University Udaipur
Correspondence E-Mail: priyanka1sharma12@gmail.com
[2]Prof. DilendraHiran,
Faculty of Computer Science, Pacific Academy of Higher Education and Research University Udaipur
[3]Dr. Rajesh Kanja,
Faculty of Computer Science, Pacific Academy of Higher Education and Research University Udaipur

Abstract

Big Data Analytics and Business Intelligence Systems have a significant impact on organizational performance by providing data-driven insights, improving decision-making processes, and enhancing operational efficiency. These technologies empower organizations to adapt swiftly to market changes, optimize resource allocation, and gain a competitive edge in today's data-driven business landscape. Ultimately, their adoption leads to improved performance and sustainable growth.
Keywords: *Big Data Analytics, Business Intelligent System, Organizational Performance*

4745

1. Introduction

Today with the generation of digital data the organizations across the world are moving towards advance data analytics or big data analytics and business intelligence systems in order to get new insights and patterns which are valuable for decision making and strategy formulation. Collectively the terms are known as BDA-BI (Big Data Analytics and Business Intelligence). The BDA-BI system helps the organizations to make data-driven decisions with operational excellence and competitiveness which ultimately impact the overall performance or organizations. The main purpose of the study is to assess the extent of adoption and utilization of big data analytics and business intelligence systems in private and public sector organizations in India and to identify the effect of big data analytics & business intelligent system on organizational performance of private and public sector organizations in India.

2. Review of Literature

Gurcan et al. (2023) studied various research papers related to business intelligence systems and its dynamics. It was found that many research has been done related to various aspects of the concern field. The modelling topic when research reflected 36 distinct topics which further included sub topics like "Organizational Capability," "AI Applications," "Data Mining," "Big Data Analytics," and "Visualization". Author provides valuable information related to different latest development and future directions in the field of business intelligence.

Nenonen et al. (2022)suggested that Business Intelligence Systems (BIS) play a pivotal role in an organization's ability to store, manage, analyse, and leverage data to gain insights and create innovative products and services.

Popovic et al. (2018)investigates the impact of Big Data Analytics (BDA) on operations management within the manufacturing sector, an

underexplored context. Using a qualitative approach and comparative case studies of three manufacturing companies with varying BDA usage levels, the research reveals that BDA capability and organizational readiness and design factors play pivotal roles in enhancing decision-making and high-value business performance. Additionally, the study emphasizes BDA's potential to empower employees and enhance management capabilities without replacing them. These findings contribute valuable insights for both academics and practitioners, shedding light on the tangible business benefits of BDA in manufacturing and its potential for positive societal impact.

Raffoni et al. (2018)emphasize that organizations face challenges in owning and managing big data, particularly concerning the volume, quality, accuracy, and validity of the data. These challenges highlight the need for effective data management strategies.

Nambisan et al. (2017)discuss how a well-developed business intelligence strategy can be a valuable asset for organizations. They suggest that such strategies can help organizations gain a competitive edge by extracting new value from data.

Wamba et al. (2017)in the study explored the correlation between big data analytics and firm performance, with a particular focus on the role of dynamic capabilities. Their empirical findings highlighted a positive and significant relationship between the use of big data analytics and overall firm performance. Furthermore, the study emphasized that dynamic capabilities within organizations mediate this connection, suggesting that companies with strong adaptive and innovative capacities are better equipped to leverage big data analytics for enhanced performance. These findings underscore the strategic significance of both adopting big data analytics and cultivating dynamic capabilities for modern businesses navigating the data-driven landscape.

According to**Jiwat Ram et al. (2016)** the study acknowledges the transformative impact of social media on global business operations, particularly in terms of collecting vast datasets. These data stores, primarily from various social media platforms, present a compelling case for leveraging Big Data analytics for business

intelligence. However, a noticeable research gap exists in understanding the implications of this integration. Therefore, this research focuses on examining the role and consequences of Big Data analytics in the context of business intelligence, specifically with data collected from Chinese social media channels. Employing a qualitative approach, the study plans to conduct 35-40 interviews across diverse industries, including retail and manufacturing, involving stakeholders such as IT managers and senior business managers. The data collected will be analyzed using Nvivo to identify critical issues that can unlock value through Big Data analytics for business intelligence purposes. The study's outcomes hold significant potential to inform both theoretical understanding and practical strategies for optimizing the benefits of social media channels for business value.

Author**McAfee A. et al. (2012)**delved into the transformative impact of big data on management practices. It probably introduced the concept of big data, emphasizing its potential to revolutionize decision-making and operational optimization within organizations. The paper might have underscored the importance of advanced analytics and data mining techniques in extracting valuable insights from vast and complex datasets. It might have discussed the challenges and opportunities associated with big data management, showcasing real-world examples of successful implementation. Furthermore, the paper likely speculated on the long-term implications of the big data revolution for various industries and sectors, highlighting its significance in the evolving business landscape. For specific details or quotes from the paper, referring to the original source through academic databases or the Harvard Business Review's official website is recommended.

3. Research Methodology

Research methodology refers to the systematic approach and techniques employed to conduct research, guiding the selection of data collection methods, data analysis, and interpretation of results. It serves as the framework that ensures the rigor, validity, and reliability of the research process, allowing for the generation of meaningful and credible findings.

3.1 Objectives:
Following are the research objectives:

Priyanka Sharma et al/ Impact of Big Data Analytics &Business Intelligent System on Organization Performance of Private and Public Sector Organizations in India

1. To assess the extent of adoption and utilization of big data analytics and business intelligence systems in private and public sector organizations in India.
2. To find out the effect of big data analytics & business intelligent system on organizational performance of private and public sector organizations in India

3.2 Hypotheses:

Hypothesis 1: There is no significant difference between adoption and utilization of big data analytics and business intelligence systems in private and public sector organizations in India.

Hypothesis 2: The implementation of big data analytics and business intelligence systems significantly enhances the organizational performance of both private and public sector organizations in India.

4. Data Analysis and Interpretation

4.1 Respondent Profile:

Gender wise classification:

Based on gender wise classification it was found that about 100 respondents were male and 100 respondents were female from total sample size of 200. The respondents were basically users of Big Data Analytics and Business Intelligence Systems having positions as managers, senior officials, executives etc from both public and private sector.

Classification based on type of organization:

The table below shows the classification of respondents based on type of organization either public or private.

Table 4.1: Type of Organization

Type of Organization			
	Number of Respondents	Percentage (%)	Cumulative Percent
Private	100	50.0	50.0
Public	100	50.0	100.0
Total	200	100.0	

From the total respondents about 50% were from the private organization which accounts for 100 respondents and about 50% respondents were form public organization working at different managerial, executive, and senior positions.

4.2 Results of Hypothesis Testing:

In order to find the association between adoption,utilization of big data analytics & business intelligence systems and type of organization the hypothesis H1 was being framed and being tested using the Chi-Square test. The null and alternate hypothesis of H1 is shown below.

$H_0 1$:There is no significant difference between adoption and utilization of big data analytics and business intelligence systems in private and public sector organizations in India.

$H_a 1$:There is significant difference between adoption and utilization of big data analytics and business intelligence systems in private and public sector organizations in India.

Table 4.2: Cross-tabulation: Adoption, Utilization and Type of Organization

Cross Tabulation						
		Adoption, Utilization of Big Data Analytics and Business Intelligence Systems				
		Very Low	Low	High	Very High	Total
Type of Org.	Private	12	7	40	41	100
	Public	0	0	50	50	100
Total		12	7	90	91	200

According the Chi-Square test determines that if there is statistically significant association between the categorical variables' adoption, utilization, and type of organization. The Chi-Square test results which includes Pearson Chi-Square, Likelihood Ratio and No. of Valid Cases as shown below in the table: "Chi-Square Tests Results."

Table 4.3: Chi-Square Test

Chi-Square Test			
	Value	Degree of Freedom	Asymptotic Significance (2-sided)
Pearson Chi-Square	21.001[a]	3	.000
Likelihood Ratio	28.345	3	.000
N of Valid Cases	200		
a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is 3.50.			

4748

The calculated Pearson Chi-Square is found to be 21.001 at degree of freedom 3,Likelihood Ratio is found to be 28.345 ad degree of freedom 3 also the corresponding p-value (Asymptotic Significance)for both is 0.00 which quite lesser than the standard alpha value of 0.05. So, it can be interpreted that as the p-value (0.00) < 0.05 suggesting that the null hypothesis H_01 is being rejected and finally it can be said that there is significant difference between adoption and utilization of big data analytics and business intelligence systems in private and public sector organizations in India. The level of utilization andadoption of big data analytics and business intelligence vary based on type of organization either private or public.

4.3 BDA-BIS and Organizational Performance:
In order to find the association between big data analytics& business intelligence systems and organizational performance in both public and private organization one sample T-Test was being applied. The null and alternate hypothesis of H2 is shown below:

H_02: The implementation of big data analytics and business intelligence systems significantly doesn't enhance the organizational performance of both private and public sector organizations in India.
H_a2: The implementation of big data analytics and business intelligence systems significantly enhances the organizational performance of both private and public sector organizations in India.
According to the table shown below the one sample statistics results of BDA-BIS and organizational performancehaving mean value of 3.6050,standard deviation of 1.16437 and standard error mean value of 0.08233.

Table 4.4: One-Sample Statistics

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
BDA-BIS and Organizational Performance	200	3.6050	1.16437	.08233

The statistical test T-test is being applied to find that there is statically significant relationship between big data analytics & business intelligent system and organizational performance. The T-Test results are shown below in the table: "One-Sample Test".

Table 4.5: One-Sample Test

One-Sample Test						
	Test Value = 0					
					95% Confidence Interval of the Difference	
	t	Degree of Freedom	Sig. (2-tailed)	Mean Difference	Lower	Upper
BDA-BIS and Organizational Performance	43.785	199	.000	3.60500	3.4426	3.7674

The calculated T-test value is found to be 43.785 at degree of freedom 199, the mean difference value is found to be 3.60500, 95% confidence interval of the difference includes the lower value 3.4426 and upper value 3.7674 and the corresponding p-value is found to be 0.00 which is lower than the standard alpha value of 0.05 which further confirms that the null hypothesis $H_0 2$ is being rejected and the alternate hypothesis in being accepted at 5% level of significance.The rejection of $H_0 2$ indicates strong evidence against the null hypothesis suggesting that the implementation of big data analytics and business intelligence systems significantly enhances the organizational performance of both private and public sector organizations in India.This interpretation suggests that when organizations in India adopt and effectively utilize these technologies, they are likely to experience improvements in various aspects of their performance. This could encompass increased efficiency, better decision-making, enhanced resource allocation, and potentially a competitive advantage in their respective sectors.

5. Conclusion

The two main objectives of study were to assess the extent of adoption and utilization of big data analytics and business intelligence systems in private and public sector organizations in India and to find out the effect of big data analytics & business intelligent system on organizational performance of private and public sector organizations in India. Based on above mentioned objectives hypotheses H1 and H2 were being framed and were test using the Chi-Square test and T test. The results confirm that the rejection of $H_0 1$ indicates a significant difference in the adoption and utilization of big data analytics and business intelligence systems between private and public sector organizations in India. This variation underscores distinct levels of implementation based on organizational type. Similarly, the hypothesis $H_0 2$ was being rejected suggesting that adoption of big data analytics and business intelligence systems in India

organizations significantly improves the organizational performance of both private and public sector entities.

References:

1. Gurcan, Fatih&Ayaz, Ahmet&MenekşeDalveren, Gonca&Derawi, Mohammad. (2023). Business Intelligence Strategies, Best Practices, and Latest Trends: Analysis of Scientometric Data from 2003 to 2023 Using Machine Learning. Sustainability. 15. 9854. 10.3390/su15139854.

2. Jiwat Ram, Changyu Zhang, & Andy Koronios. (2016). The Implications of Big Data Analytics on Business Intelligence: A Qualitative Study in China. Procedia Computer Science, 87, 221-226.

3. McAfee A, et al. Big data: the management revolution. Harvard Bus Rev. 2012;90(10):60–8.

4. Nambisan, S., Lyytinen, K., Majchrzak, A., Song, M. (2017). Digital innovation management: reinventing innovation management research in a digital world. MIS Quart. 41 (1), 223–238.

5. Nenonen, S., &Storbacka, K. (2018). Smash: using market shaping to design new strategies for innovation, value creation, and growth. Emerald Group Publishing.

6. Popovic, Aleš & Hackney, Ray &Tassabehji, Rana&Castelli, Mauro. (2018). The impact of big data analytics on firms' high value business performance. Information Systems Frontiers. 20. 1-14. 10.1007/s10796-016-9720-4.

7. Raffoni, A., Visani, F., Bartolini, M., & Silvi, R. (2018). Business performance analytics: exploring the potential for performance management systems. Production Planning & Control, 29(1), 51-67.

8. Wamba SF, et al. Big data analytics and firm performance: effects of dynamic capabilities. J Bus Res. 2017;70:356–65.