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The Impact of Business Intelligence Tools and Big Data on Organizational Performance: A Case Study of Airport International Group

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Abstract:

This study aimed to examine the impact of Business Intelligence (BI) tools and Big Data on organizational performance within the Airport International Group. Specifically, it investigated the effects of analytics capabilities, data management, performance reporting, and Big Data on enhancing organizational performance. A quantitative descriptive-analytical approach was adopted. Data were collected through a structured questionnaire distributed using a stratified random sampling technique. A total of 150 questionnaires were distributed, of which 130 valid responses were analyzed using regression analysis to test the proposed hypotheses. The findings revealed that analytics capabilities and performance reporting significantly improve organizational performance, while data management did not demonstrate a significant effect when examined simultaneously with other BI dimensions. Big Data exhibited the strongest positive influence on organizational performance. Furthermore, integrating Business Intelligence initiatives with Big Data explained a substantial proportion of the variance in organizational performance, highlighting the complementary role of these technologies in improving organizational effectiveness. Organizations should prioritize investments in advanced analytics, real-time performance reporting systems, and Big Data technologies to improve decision-making quality, operational efficiency, and sustainable organizational performance. Social Implications: The effective implementation of Business Intelligence and Big Data contributes to improving service quality, increasing customer satisfaction, enhancing operational transparency, and supporting sustainable digital transformation initiatives. This study provides empirical evidence regarding the combined effects of Business Intelligence tools and Big Data on organizational performance in the aviation sector. It extends the existing literature by demonstrating the complementary relationship between Business Intelligence capabilities and Big Data technologies in enhancing organizational effectiveness and supporting strategic decision-making.

Keywords: *Business Intelligence; Big Data; Organizational Performance; Data Management; Analytics Capabilities; Performance Reporting.*

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أثر أدوات ذكاء الأعمال والبيانات الضخمة على الأداء التنظيمي: دراسة حالة لمجموعة مطارات إنترناشونال

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ملخص:

هدفت هذه الدراسة إلى التعرف إلى أثر أدوات ذكاء الأعمال والبيانات الضخمة في تحسين الأداء التنظيمي في مجموعة المطار الدولية، من خلال دراسة أثر القدرات التحليلية، وإدارة البيانات، وتقارير الأداء، والبيانات الضخمة على الأداء التنظيمي. اعتمدت الدراسة المنهج الوصفي التحليلي، وتم جمع البيانات باستخدام استبانة وُزعت وفق أسلوب العينة العشوائية الطبقية. وقد تم توزيع (150) استبانة، واسترجاع (130) استبانة صالحة للتحليل الإحصائي، وتم اختبار فرضيات الدراسة باستخدام تحليل الانحدار. أظهرت النتائج أن القدرات التحليلية وتقارير الأداء تؤثران تأثيرًا إيجابيًا ودالًا إحصائيًا في الأداء التنظيمي، في حين لم تظهر إدارة البيانات أثرًا معنويًا عند تحليلها مع بقية أبعاد ذكاء الأعمال. كما تبين أن البيانات الضخمة تمثل العامل الأكثر تأثيرًا في تحسين الأداء التنظيمي، وأن التكامل بين أدوات ذكاء الأعمال وتقنيات البيانات الضخمة يفسر نسبة كبيرة من التباين في الأداء التنظيمي، مما يعكس الدور التكميلي بين هاتين التقنيتين في تعزيز كفاءة المؤسسات. وتوصي الدراسة المؤسسات بالاستثمار في القدرات التحليلية المتقدمة، وأنظمة تقارير الأداء الفورية، وتقنيات البيانات الضخمة لتعزيز جودة القرارات الإدارية، وتحسين الكفاءة التشغيلية، وتحقيق التحول الرقمي المستدام. وتكمن الأصالة العلمية للدراسة في تقديم دليل تجريبي على الأثر المشترك لأدوات ذكاء الأعمال والبيانات الضخمة في تحسين الأداء التنظيمي في قطاع الطيران، بما يسهم في إثراء الأدبيات المتعلقة بالتحول الرقمي ودعم اتخاذ القرار.

الكلمات المفتاحية: *ذكاء الأعمال؛ البيانات الضخمة؛ الأداء التنظيمي؛ إدارة البيانات؛ قدرات التحليل؛ تقارير الأداء.*

1. Introduction

To address today's needed advanced strategic approaches, it has become necessary that organizations be very dynamic in this world of rapid technological change and highly competitive environment. Business Intelligence with Big Data analytics in this context enable organizations to run large datasets through various complex analytical functions and convert the results into meaningful insights that informs business decisions, drive efficiency, enhance customer satisfaction and service quality. Moreover, recent research has shed light on the positive impact of business intelligence capabilities on firms' performance and on organizational performance via business intelligence infrastructure and analytical decision support capabilities due to the utilization of big data analytics (Khaddam et al., 2023; Ilmudeen, 2021).

Business Intelligence apps involve analytical tools, data administration systems, reports capabilities, and performance monitoring capabilities that aid businesses pull, process and analyze information more effectively. The capabilities are a boost to decision making quality through further erasing the risk of data falling into the wrong hands, data analytics capabilities, and organizational data literacy. In a study of data governance and business analytics competencies, Fattah (2024) demonstrated that data governance and business analytics capabilities can enhance the capacities of decision-making as part of big data literacy and analytics competencies.

Alongside, Big Data analytics becomes a critical component in such fields as logistics and aviation services, where significant amounts of data are created in various operational and customer-related situations are continuously generated. Data analytics and machine learning in airport environments demonstrated its ability to assess service-quality determinants, including staff performance, queue management, passenger experience, and other elements of airport operations to guide targeted service improvements (Pholsook et al., 2025).

Business Intelligence and Big Data, therefore, have a relevant empirical context in their use at the International Airport Group in Queen Alia International Airport. There are many data flows in the Airport environment including passenger data through to the airport, logistics data movement, service delivery and customer feedback data. Thus, the use of BI tools like analytics capability, data management, reporting or monitoring operation performance in conjunction with Big Data applications may offer informative data about the operational efficiency, satisfaction of customers and logistics services quality.

2. Literature Review

2.1 Learning Outcomes

The Business Intelligence (BI) functionality is one of the most impacting technologies organizations use to transform their raw data into valuable knowledge that they use for better strategic and operational decision making. The unprecedented pace of digital technology developments, combined with a greater pressure for competition, has prompted organizations to incorporate BI into their management frameworks with the aim of gaining sustainable competitive advantage, optimizing business processes and making the organization more responsive. In modern BI solutions, data gathering, storage, analysis, visualization and monitoring are all combined within a single unified decision support system. As such, BI has grown into an organization's strategic capability that helps increase information quality and organizational performance (Khaddam et al., 2023).

According to the recent literature, the idea of Business Intelligence is a dynamic capability of the organizations, which help firms to detect environment changes, convert organizational knowledge to organizational knowledge into intelligence and assist the organizations to respond strategically. The Dynamic Capabilities Theory inspired Khaddam et al. (2023) to propose and test the Sense–

Transform–Drive (STD) model using data from 236 companies. They found that BI capabilities are positively associated with operating efficiency and firm performance as a result of the interplay of three elements within this model: sensing capabilities, knowledge transformation and strategic execution. They observed that the Operations Effectiveness is positively impacted by the presence of BI capabilities in an organization, as their observations showed that when an organization has BI capability, the managerial decision-making quality and the agility of the organization could be improved by the use of the capabilities of BI.

But it's important to note that Business Intelligence thrives on a host of complimentary organizational capabilities such as analytics skills, data management and performance reporting. Organizations can uncover patterns and relationships that are not obvious on the surface, forecast future trends, and make data-driven decisions to enhance management decisions. An organization's information is only as useful as its quality of data management, keeping it true, integrated, consistent, and easily accessible for analytical use. Similarly, performance reporting offers managers with real time dashboards or key performance indicators (KPIs) that allows them to monitor performance activities at their organization in real time and take timely corrective actions. These embedded features considerably enhance organizational malleability and enhance decision quality in data-rich areas like aircraft, transportation and logistics (Salsabila et al., 2024).

In addition, there is recent empirical data available that indicates that BI indirectly results in organizational performance in terms of decision-making speed, decision comprehensiveness and organizational learning. With developed BI infrastructure, the organization can quickly understand its business information to coordinate all the activities between different departments quickly, allocate organizational resources more efficiently and be proactive in response to changes. You can easily find that these capabilities ultimately lead to better efficiency for operations, customer satisfaction and service quality. As such, BI is becoming an organizational skill more than just an investment in information technology, with the goal of generating long-term value for the organization by leveraging information for managerial decisions (Alzghoul et al., 2024).

Nowadays, with the emergence of Business Intelligence (BI) as a strategic capability of an organization, companies are able to turn raw data into knowledge that helps them make decisions on their strategic and operational posture. In the era of digital transformation and growing complexity of business environments, companies are focused on enhancing the quality of information, optimizing internal business processes and boosting their competitive edge by investing in BI technologies. The modern BIS merges information gathering, storage, processing, visualization, reporting capabilities with the late-support environment to enable managers to make decisions based on evidence and thus enhance the productivity of their organizations (Chen & Lin, 2021).

In recent studies, BI is no longer considered to be as an application of information technology but as an organizational competence, which enhances knowledge learning and evokes flexibility and continuous performance improvement in an organization. In line with the concepts of Dynamic Capabilities Theory, BI allows organizations to detect changes in the environment, translate all corporate knowledge into valuable insights, and execute strategic actions that enhance the efficiency of working and the performance of the enterprise in general (Khaddam et al., 2023).

Business Intelligence is dependent on the effectiveness of some other complementary capabilities such as analytics capabilities, data management, and performance reporting. All these abilities enhance the quality, availability, and usefulness of organizational information. With analytics capabilities, companies can discover the relationships that exist between massive amounts of data, forecast business patterns and enable evidence-based decision making. Similarly, the ability to conduct analytics on organizational data depends upon the accurate, consistent, integrated and

timely availability of data, while performance reporting allows managers to be able to continuously track the activities within the organization through dashboards and key performance indicators (KPIs). Thus, an organization with advanced BI capabilities possesses better organizational agility, quicker adaption to the environmental changes, and a better operational performance (Salsabila et al., 2024).

Moreover, evidence collected suggests that impact of BI on organizational performance is indirect, as it helps to speed up decision making process, enrich the content of decisions, and facilitate the use of the organizational knowledge. By leveraging BI technologies properly, organizations can allocate resources efficiently, take a holistic look at cross-functional activities, find production bottlenecks and act proactively to customers' needs. This process leads to more efficient operations, higher customer satisfaction, and better service, and is especially critical for companies in the information industry, like aviation and logistics (Ilmudeen, 2021).

2.2 Analytics Capabilities

One of the key components of Business Intelligence (BI) is the analytics aspect that allows organizations to convert data into meaningful and insightful information that can aid in both tactical and strategic decision-making. Instead of just acting on past data, today's analytics will use descriptive, diagnostic, predictive and prescriptive analytics to search for hidden patterns, make predictions about what will happen next in the business and make recommendations for best business decisions. This means that organizations with greater analytical capabilities can better adapt to market fluctuations, make efficient use of resources and enhance the competitiveness of the organization (Adewusi et al., 2024).

In recent years, studies indicate that analytics has been more than just a technology, it has also been an organizational competency, managerial expertise and expertise in transforming analytical findings to strategic actions. These organizations that have more advanced analytics functions are able to analyses vast amounts of both structured and unstructured data as it happens and as a result, they're able to enhance their forecasting precision, up and down planning and strategic responsiveness. The analytical skills lower the level of uncertainty in board management choices and heavily boost organizational agility, specifically when faced with fast-changing technologies and markets (Rahman, 2025).

Moreover, analytics also helps organizations improve their performances by speeding up decision-making, and extending it. Analytical intelligences can aid decision makers in thinking through many options at once, examining potential risks, and finding opportunities for change in an analytical manner, not on the basis of intuition. Empirical studies have proven the indirect link business intelligence has on the firm's performance, as better decision-making speed and comprehensiveness indicate that analytical capabilities are an essential mediator in the process by which business intelligence creates value for organization (Salsabila et al., 2024).

In the aviation and airport domain, the aviation environment generates extensive amounts of data on a daily basis, related to operations, logistics, financial and passenger data and which now plays an increasing role in the analytics capabilities within the aviation and airport sector. With advanced analytics, airport management can create a more efficient passenger flow in the airport, optimize the efficiency of the bags and predict baggage congestion, allocate operational resources more efficiently, and ensure more safety and service quality. Hence, in complex transportation systems, the importance of analytics capabilities in boosting operational efficiency, customer satisfaction, and logistics service quality is growing in importance (Khaddam et al., 2023).

2.3 Data Management

Data management is an essential component of Business Intelligence (BI), as it is crucial that the data used to create analytical outcomes is of good quality, consistent, integrated and available within an organization. The machines that rely on digital technologies and the data they generate for decision making are a growing fixture in the organizational landscape, and successful data management has advanced beyond the realm of "technical" to "organizational capability. Digital technologies and data-driven decision making have become a growing part of organizations and effective data management has grown from a technical function into the strategic organizational capability. The collective term for all these practices related to data is called data acquisition, storing, cleansing and integrating, and managing data governance, security and accessibility with timely and accurate information to support decision-making activities for strategic and operational activities (Fattah, 2024).

Several recent studies have shown that organizations with advanced data management processes generate better business results, because a quality data enables better business performance and more effective use of Business Intelligence (BI) systems. Multiple sources of internal data organization can be integrated to provide managers with a complete and detailed overview of how the business is running, and data governance can help ensure data reliability, consistency and compliance to regulations. This means that proper data management leads to decreased information duplication, decision costs, and boosts the business's agility in fast-changing market situations (Vadigicherla, 2025).

The importance of data management further increases when Business Intelligence systems are connected with Big Data technologies. Structured, semi-structured and unstructured data from operational systems, customer engagement points, social media and the Internet of Things (IoT) devices need to be processed by the organization. If data is not managed properly, its cleansing processes, data integrity solutions, and other architectures can result in inaccurate insights that can impact decision making. Hence, data management is the base from which Business Intelligence and Big Data analytics can extract valuable and meaningful information (knowledge) (Marella et al., 2025).

Moreover, modernized organizations increasingly understand that data management is a direct factor in the company's performance, helping to increase transparency of information, cross-functional collaboration, and speed up managerial decision-making. Such an effective management of organizational data enables managers to track real time operations, detect performance deviations on time and take appropriate corrective action as and when necessary before the operational issues result into any big hassles. These features are especially crucial in the aviation/airport context where there is massive flow of operational, logistics and passenger type data elements that need constant monitoring to ensure efficiency, customer satisfaction and logistics/services quality (Fattah, 2024; Phan & Baird, 2026).

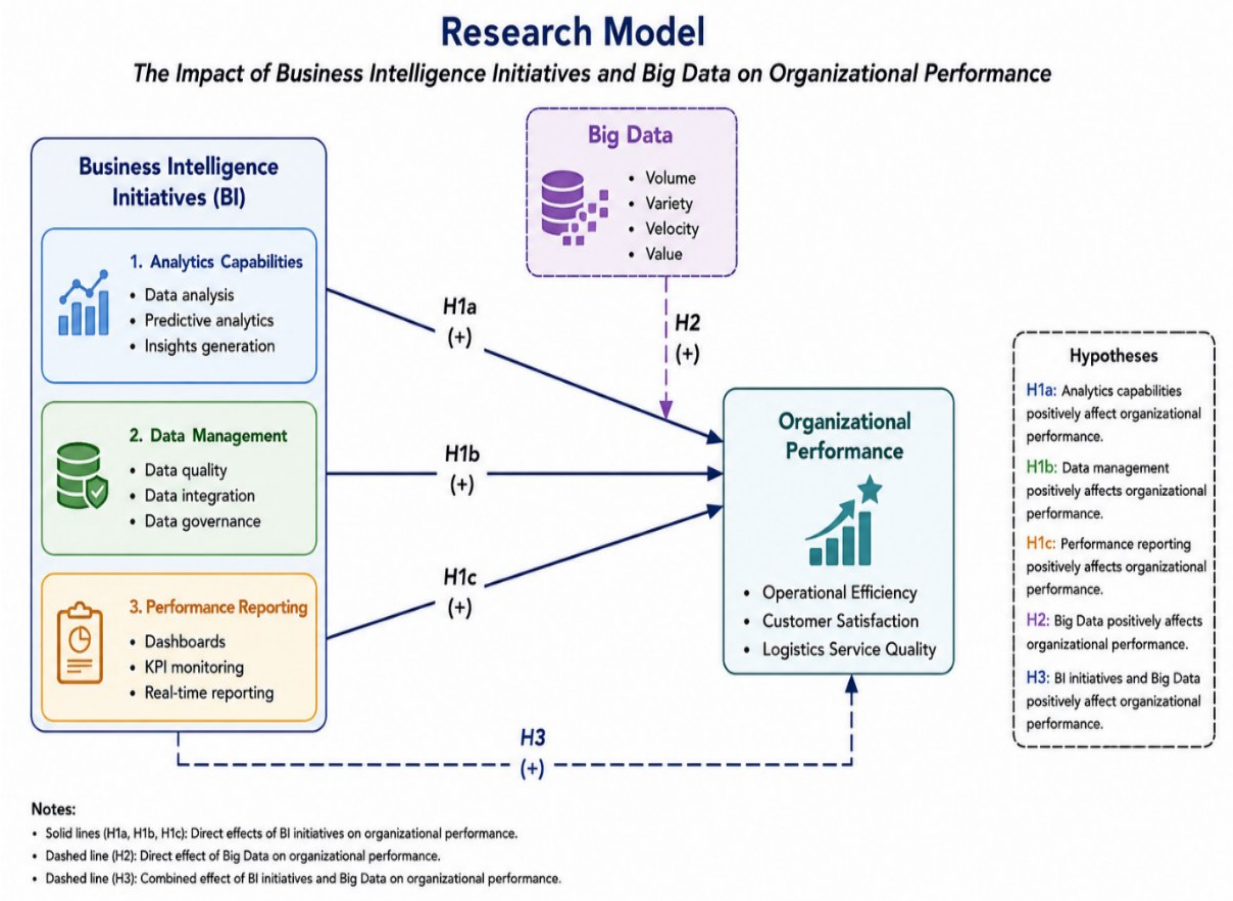

Fig. 1: Study model

3. Methodology

The study population represents different departments within the organization therefore researchers used representative sampling to collect diverse employee views about Business Intelligence and Big Data effects on performance. A demographic representation of 150 employees received 150 questionnaires designed for the selected set of departments. A total response rate reached 141 questionnaires among the 150 distributed surveys which corresponds to 94% of completion. The analysis used 130 valid questionnaires obtained from 141 returned questionnaires following the review process. The obtained rate equaled 90% of the distributed questionnaires.

A stratified random sampling approach was used to select the representative sample which included equal representation of different departments. The methodology ensures departments throughout the population receive fair representation identical to their total numbers. The research findings become more reliable as well as generalizable when using this method because each subgroup of the population gets appropriately represented in the sample according to Creswell and Creswell (2017).

Stratified random sampling proved preferable to simple random sampling since it ensures proper representation of all significant departments thus permitting detailed and precise investigation. The organization selected stratified random sampling to establish a fair depiction of multiple departments thus creating results that apply across all organizational areas.

4. Results:

The results of the hypotheses testing for the impact of Business Intelligence (BI) tools on organizational performance are presented below. Each hypothesis is analyzed by examining the relationship between the variables through regression analysis.

H1 Testing: BI Initiatives and Organizational Performance

Table 1. H1 Testing.

Model		Coefficients: Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	R	R^2
1	(Constant)	1.756	.286		6.211	.001	.634[a]	.439
	Analytics capabilities	.281	.096	.342	3.112	.000		
	Data management	.001	.123	.002	.017	.951		
	Performance reporting	.300	.122	.343	2.211	.015		

Interpretation of H1 Results:

- Analytics capabilities have a significant positive effect on organizational performance ($\beta = 0.342$, $t = 3.112$, $p < 0.001$).
- Data management does not show a statistically significant impact ($\beta = 0.002$, $t = 0.017$, $p = 0.951$).
- Performance reporting has a significant positive influence ($\beta = 0.343$, $t = 2.211$, $p = 0.015$).

Thus, H1 is partially supported, as analytics capabilities and performance reporting significantly enhance organizational performance, while data management does not exhibit a meaningful effect.

Testing Sub-Hypothesis (H1a): Analytics Capabilities and Organizational Performance

Table 2: H1a Testing Results

Model		Coefficients: Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	R	R^2
1	(Constant)	2.244	.222		9.011	.001	.656[a]	.399
	Analytics capabilities	.465	.049	.677	7.545	.001		

Interpretation of H1a Results:

Analytics capabilities have a strong, positive, and statistically significant impact on organizational performance ($\beta = 0.677$, $t = 7.545$, $p < 0.001$). This highlights the critical role of data analytics in driving performance improvements.

Testing Sub-Hypothesis (H1b): Data Management and Organizational Performance

Table 3: H1b Testing Results

Model		Coefficients: Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	R	R^2
1	(Constant)	2.433	.212		9.701	.002	.551[a]	.342
	Data management	.366	.045	.566	6.401	.002		

Interpretation of H1b Results:

Data management has a significant positive effect on organizational performance ($\beta = 0.566$, $t = 6.401$, $p < 0.002$), confirming that effective data governance enhances decision-making and operational outcomes.

Testing Sub-Hypothesis (H1c): Performance Reporting and Organizational Performance

Table 4: H1c Testing Results

Model		Coefficients			t	Sig.	R	R^2
		Unstandardized Coefficients		Standardized Coefficients				
		B	Std. Error	Beta				
1	(Constant)	1.942	.277		6.777	.001	.601[a]	.305
	Performance reporting	.542	.069	.623	7.643	.001		

Results of H1c Interpretation:

Organizational performance is enhanced by performance reporting (8.643, 0.623, p = 0.001), thus, the need to have systematic reporting systems to monitor and improve performance.

The results of the study reveal several critical areas concerning the impacts of Business Intelligence tools on the performance of organizations. The analysis results indicate that analytics capabilities (H1a) and performance reporting (H1c) enhance the performance of organizations to a considerable extent due to their positive strong relations. Companies are advised to capitalize on advanced data analytics with the systematic monitoring of performance since these techniques prove to be very effective in leading to improved business outcomes. The research proves data management (H1b) supports organizational performance but its contributions are slightly lower than analytics ability and performance reporting capabilities. Organizations need to maintain their ongoing focus on constructing strong data governance structures to achieve ongoing operational success. The study reveals that Business Intelligence tools particularly analytics and reporting functions play a significant role in the better organizational choice-making and overall enhancement of performance. Innovative analytics systems alongside automated reporting solutions should be highlighted by organizations as a step towards increased efficiency and success in competition. The study provides future research directions whereby researchers would further their investigation to determine the role of organizational culture and technical infrastructure in determining the outcome of BI performance. The results of research offer valuable quantitative data that the executives and technology decision makers can rely on to inform their strategic realization of BI solutions in their present business processes.

H2: Big Data positively enhances organizational performance

Table 5: Testing H2.

Model		Coefficients			t	Sig.	R	R^2
		Unstandardized Coefficients		Standardized Coefficients				
		B	Std. Error	Beta				
1	(Constant)	1.398	.243		4.712	.001	.742[a]	.571
	Big	.645	.054	.787	9.926	.001		

The outcomes of the testing of H2 indicate that the Big Data has a large positive influence on the organizational performance (0.787, t = 9.926, p = 0.001). This implies that the application of Big Data is effective in improving the performance of an organization. R = 0.742 indicates that Big Data and organizational performance are strongly correlated with the independent variable (Big Data) accounting 57.1 percent of the variation in the dependent variable (organizational performance). F value is significant at the 0.05 mark which is also in favor of the conclusion that Big Data positively affects organizational performance.

H3: BI initiatives and Big data positively enhance organizational performance

Table 6: Testing H3.

Coefficients								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.		
		B	Std. Error	Beta			R	R^2
1	(Constant)	.832	.282		3.227	.001	.769[a]	.586
	Analytics capabilities	.166	.069	.211	2.034	.035		
	Data management	.031	.086	.039	.323	.742		
	Performance reporting	.167	.141	.158	1.134	.247		
	Big	.479	.076	.487	5.879	.001		

Interpretation of Results for H3:

The results of testing H3 reveal that both BI initiatives and Big Data positively enhance organizational performance:

- Analytics capabilities have a significant positive effect on organizational performance ($\beta = 0.211$, $t = 2.034$, $p = 0.035$), indicating the importance of advanced analytics in improving performance.
- Data management does not show a significant effect on organizational performance ($\beta = 0.039$, $t = 0.323$, $p = 0.742$), suggesting that it may not play as critical a role as other factors in this context.
- Performance reporting also does not have a significant impact on organizational performance ($\beta = 0.158$, $t = 1.134$, $p = 0.247$), indicating that reporting may need further refinement or optimization to be more impactful.
- Big Data shows a significant positive impact on organizational performance ($\beta = 0.487$, $t = 5.879$, $p < 0.001$), underlining the pivotal role that Big Data plays in enhancing organizational outcomes.

With an R value of 0.769 and R^2 of 0.586, the model indicates that BI initiatives and Big Data together explain 58.6% of the variance in organizational performance. The F value is significant at the 0.05 level, further supporting the hypothesis that both BI initiatives and Big Data positively contribute to improving organizational performance (See Figure 2).

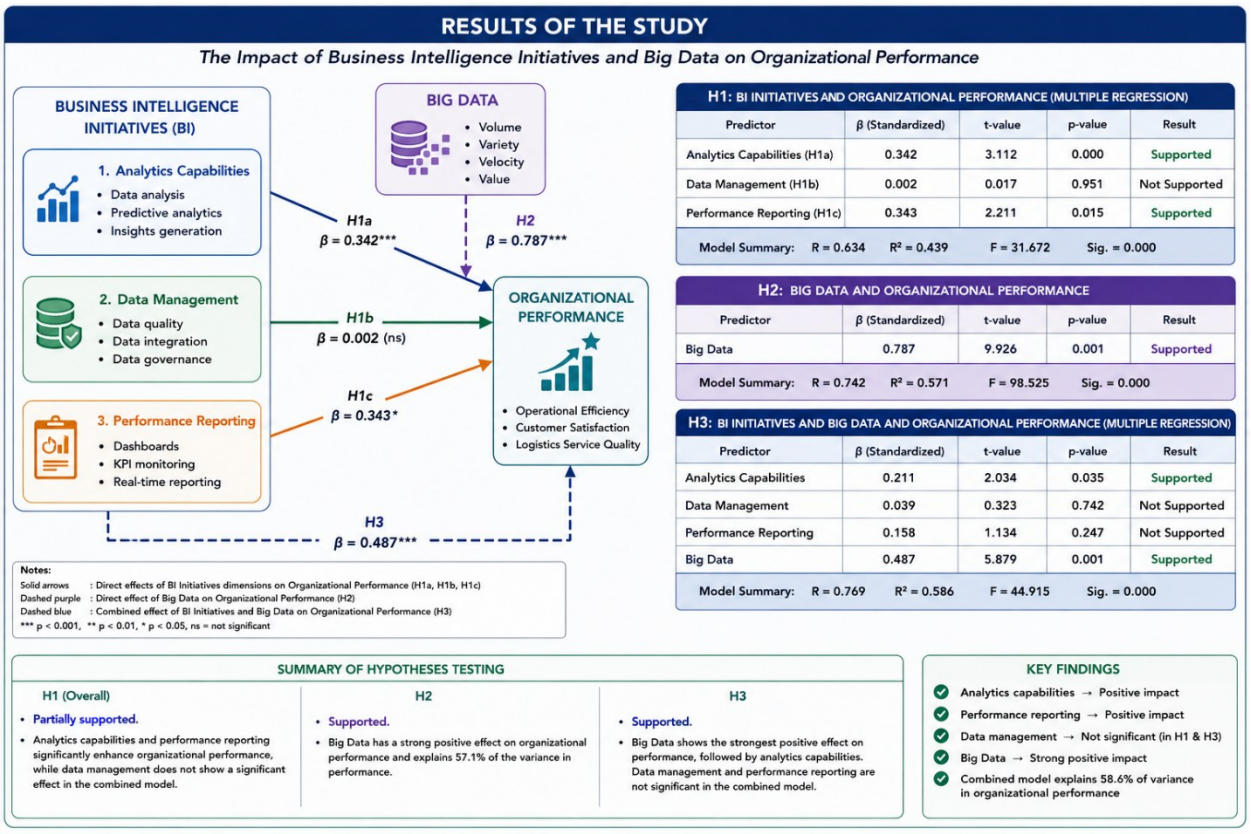

Figure 2. Final Research Model with Hypotheses Testing Results

5. Discussion

This paper examined the effect that Business Intelligence (BI) initiatives and Big Data have on the performance of the company, in the case of the International Airport Group, Jet Airways.In this study, the impact of Business Intelligence (BI) initiatives and Big Data on the performance of the International Airport Group (IAG), Jet Airways was examined. In general, the results confirmed that both BI capabilities and Big Data has impact on the overall organizational performance, but in terms of individual BI dimension and mixed BI dimension, its impacts vary. The regression models can account for 43.9% to 58.6% of the variance in organizational performance, highlighting that data-driven technologies have significant roles in organizational success.

5.1 BI Initiatives and Organizational Performance

The first hypothesis state that the introduction of Business Intelligence initiatives has a positive impact on the performance of the organization. This hypothesis was partially confirmed by the multiple regression analysis. The analysis of the direct effect of the analytics capabilities and performance reporting was positive and statistically significant, while the analysis of the direct effect of data management, when combined with the other BI dimensions, was not statistically significant. The results suggest that the two main processes of the business intelligence impact on the organizational performance are analytical intelligence and the process of performance monitoring.

The impact of analytics capability is similar to previous empirical studies which reported that a high level of analytics capability facilitates organizations' ability to produce knowledge that can be used to make decision for organizations to excel in business operations (Khaddam et al., 2023; Salsabila et al., 2024). Organizations that can use descriptive, predictive and prescriptive analytics can detect inefficiencies in their operations and predict potential future issues to address before they arise, as well as the better use of organizational resources to improve operational efficiency and organizational performance.

Likewise, the organization's performance showed statistically significant positive to the performance reporting. The immediate information necessary for executives' decision-making is delivered to them via Modern Business Intelligence dashboards, which help to monitor an organization continuously and make swift managerial decisions. The findings are aligned with recent studies which highlight the importance of implementing real-time reporting systems in fostering organizational responsiveness and enhancing the quality of decisions (Fattah, 2024).

However, although data management showed a significant positive correlation when directly analyzed alone (H1b), it was not found to significantly influence the model of multiple regression. The seeming conflicts imply that data management has some overlap with the impact of analytics skills and performance reporting. In other words, it seems, while successful data management is a key element of successful Business Intelligence implementation, it is not so obvious when organizations have more sophisticated analytical capabilities. The same points can be found in recent articles in the field of Business Intelligence that emphasize the indirect manner in which data quality impacts performance through the use of analytics instead of actual performance improvements (Fattah, 2024).

5.2 Management, Innovation and Performance in small Businesses

The second hypothesis was an examination of the effect of Big Data on organizational performance. This hypothesis was strongly supported by the empirical results as the standardized coefficient of the Big Data variable was the highest ($\beta = 0.787$) among all independent variables. In addition, it was noted that about 57.1% of the variance in organizations' performance could be accounted for by the use of the Big Data, indicating its strategic importance in the modern organizations.

The results of this study confirm the outcomes of earlier research that indicates that the Big Data analytics helps the organization handling huge amounts of structured and unstructured data, uncovering hidden operational patterns, making more accurate forecasts, and performing their operations more effectively (Ilmudeen, 2021; Fattah, 2024). During airport activities, Big Data helps to optimize the flow of passengers, the use of the resources, the coordination of all logistics, and the optimization of services, thus improving airport use effectiveness and customer satisfaction.

5.3 The synergic effects of BI initiatives and Big Data

Thirdly, the current hypothesis examined the impact on organizational performance of the combination of BI initiatives and Big Data. The findings indicated that Big Data continued to be the most powerful predictor of organizational performance ($\beta = 0.487$); although, analytics capabilities continued to have a statistically significant positive impact. Data management/processing and performance reporting, however, did not maintain their significance in the integrated model.

Preliminary results indicate that the capabilities of Big Data analytics complement the Business Intelligence capabilities, as richer and more dynamic information is provided, which is leveraged to support decisions made by the organizations. After the inclusion of the Big Data capabilities, part of the traditional explanatory power of the performance reporting/datascoping integration goes into Big Data. The results confirm that the processing or analysis of Big Data does not constitute a new technological resource, but is an advanced version of Business Intelligence (Khaddam et al., 2023; Ilmudeen, 2021).

In total, EnEMCYs accounted for 58.6% of the variance of organizational performance, leaving no doubt that when BI capabilities are effectively integrated with Big Data technologies companies achieve better organizational performance. The results validate the Dynamic Capabilities Theory, which posits that organizations that leverage their analytical capabilities as well as access to

high-volume data, will realize better operational adaptability, decision quality, and sustained competitive advantage.

6. Conclusion

The findings confirm that Business Intelligence tools and Big Data have become strategic resources for improving organizational performance in modern organizations. Analytics capabilities and performance reporting demonstrated significant positive effects on organizational performance, while Big Data emerged as the strongest predictor of performance enhancement. Although data management showed positive effects when examined independently, its influence diminished within the integrated model, suggesting that its contribution is largely mediated through advanced analytical capabilities and reporting systems. Overall, the integration of Business Intelligence initiatives with Big Data technologies provides organizations with superior decision-making capabilities, greater operational efficiency, enhanced organizational agility, and sustainable competitive advantage. These findings support the Dynamic Capabilities Theory by emphasizing that organizations capable of effectively leveraging data-driven technologies are better positioned to achieve superior organizational performance in increasingly competitive and data-intensive environments.

7. Recommendations

- Organizations should invest in advanced Business Intelligence platforms that integrate analytics capabilities with Big Data technologies to support evidence-based decision-making.
- Greater emphasis should be placed on developing advanced analytical capabilities through continuous employee training and investment in modern analytical tools.
- Organizations should implement real-time performance reporting systems and interactive dashboards to improve operational monitoring and managerial responsiveness.
- Decision-makers should strengthen Big Data infrastructure to facilitate the collection, processing, and analysis of large volumes of structured and unstructured data.
- Data governance frameworks should be continuously enhanced to ensure data quality, consistency, security, and accessibility across organizational units.
- Future research is recommended to investigate the moderating effects of organizational culture, digital transformation maturity, artificial intelligence, and technological infrastructure on the relationship between Business Intelligence capabilities, Big Data, and organizational performance.
- Similar studies should be conducted across different industries and countries to improve the generalizability of the findings and provide broader empirical evidence regarding the strategic value of Business Intelligence and Big Data.

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