Research Article

Business intelligence patterns for itsm reporting: leveraging AI and GENAI for enterprise decision-making

Venkata Subramanya, Sai Kiran, Vedagiri*

Project Manager / Technical Architect (Independent Researcher) HCL Technologies, San Antonio, Texas, USA.
* **Corresponding Author Email:** yvsskiran@gmail.com - **ORCID:** 0009-0002-6760-8099

Abstract:

The hypothetical case examined how Business Intelligence (BI) trends optimized with the help of Artificial Intelligence (AI) and Generative AI (GenAI) could be optimal in terms of IT Service Management (ITSM) reporting and support decision-making of enterprises. The study employed a mixed-methodology to determine the extent of adoption, operations enhancement and perceptions of the implements of AI-enabled BI tools by the users among medium and large organizations. The findings demonstrated that enterprises that reported ITSM with the use of AI demonstrated high accuracy in reporting, automation, visualization of service performance and decision speed. The provision of insight was also enhanced by GenAI through automated narratives, predictive notifications, and natural-language dashboarding, which increased the stakeholder engagement and executive understanding. The majority of the respondents said that they were very satisfied with AI-based reporting and indicated that they had better efficiency and proactive IT governance. Nevertheless, in spite of the issues associated with data quality and complexity of integration as well as readiness in terms of skills, the study also came to the conclusion that AI and GenAI could act as the strategic enablers of intelligent ITSM analytics to unlock data-driven operational excellence and enable anticipatory decision-making in dynamic enterprise settings.

1. Introduction

In the modern digital business, Information Technology Service Management (ITSM) has replaced a support-focused role with the strategic underpinning of business survival, client satisfaction, and competitiveness in the organization. With enterprises ever more dependent on distributed digital systems, cloud-based environments, and workflows based on automation, ITSM environments are currently producing enormous and non-uniform data volumes in terms of incident management, change management, asset visibility, service performance, and user experience metrics. Although the conventional Business Intelligence (BI) systems assisted organisations in gathering and reporting such data, they tended to be limited to static display, manual interpretation, and poor predictive power. Therefore, ITSM leaders were struggling to make data-driven decisions in a timely manner, identify service anomalies at an early stage, and solve problems proactively even before they affected business operations.

The development of the Artificial Intelligence (AI) and Generative AI (GenAI) has conceptually changed the possibilities of BI in ITSM reporting. BI models that are enhanced with AI allow automatic detection of patterns, identification of anomalies, trend prediction, and intelligent alerts and can change the IT operations teams focus on reactive problem-solving to proactive decision-making. In the meantime, GenAI goes even further and automates narrative insights, comes up with natural-language explanations, and helps the stakeholders with real-time recommendations, contextual predictions, and action plans. These democratize analytics, making it less reliant on data experts and more likely to give IT executives, service desk staff, and executives fast, explainable, and actionable intelligence.In firms that introduced AI-based BI plans, high returns in the efficiency of reports, real-time situational awareness, and incident resolutions, and governance maturity are reported. In addition to that, the ability to axiomatise structured and unstructured data, such as service logs and knowledge bases and user

feedback, has improved predictive incident management and operational resilience. These benefits however come along with challenges in respect to data quality, lack of AI skills, integration of systems, ethical management and organizational readiness to AI-enhanced processes.This paper investigated the application of Business Intelligence trends that incorporated AI and GenAI in improving ITSM reporting and enterprise decision-making. It looked into adoption patterns, performance performance, and user impressions in enterprise IT settings. This study has added to the emerging literature in terms of intelligent service operations, digital transformation, and the future of proactive IT governance due to its analysis of strategic alignment between AI-assisted analytics and ITSM maturity. The results provided information to business organizations that are interested in changing their ITSM environment with the help of data-driven intelligence, new automation opportunities, and future generation AI reporting frameworks, which enable quicker, smarter, and more resilient decision-making.

2. Literature review

Marjamäki (2017) carried out a systematic mapping review tracking the evolution of BI platforms and identifying the recent trends as real-time analytics, automation, and BI solutions based on clouds. The paper has highlighted that BI systems have developed into more sophisticated analytical systems that are able to support dynamic and predictive decision-making processes in businesses as opposed to the previous reporting systems.

Arnott, Lizama, and Song (2017) examined organizational trends of BI systems use and discovered that organizations used BI tools to monitor their operations, as well as in strategic planning and competitive advantage. Their results indicated that the mature BI setting was dependent on user training, governance frameworks, and executive presence in an attempt to draw maximum advantages by the analytical frameworks. On the same note, Novak and Buřita (2019) recognised the spread of BI applications outside business to illustrate the functionality of BI in multifaceted data-processing strategies like Intelligence, Surveillance, and Reconnaissance (ISR) systems in war proceedings. Their study revealed that BI tools were useful in supporting decision-making processes at high stakes by merging both large volumes of structured and unstructured data.

Imroz (2016) examined the most relevant performance indicators related to the ITIL request fulfillment process and demonstrated the ability of BI-driven dashboards to increase the visibility of the executive and accountability of the services. The qualitative case study depicted how dashboards assisted in converting unstructured operational information to executive information, which enhanced service governance and efficiency in reporting. Continuing on the use of BI in proactive service management, Fuertes et al. (2017) suggested a BI-based framework of the academic Computer Security Incident Response Teams (CSIRTs). Their model combined reactive and proactive security services using BI analytics with focus on the practicality of predictive patterns and automated alerts to increase IT response preparedness.Pradhan et al. (2022) studied how AI chatbots and visualization systems might be applied in the context of the ITSM and found out that the efficiency of the service desk and user support experience positively depended on AI-based conversational interfaces. Their analysis indicated that AI-based BI dashboards enabled them to report incident faster and more efficiently visualized the trends of their operations and interacted with IT support systems. These findings were consistent with the overall trend of the research that has found BI as an emerging ecosystem that is enhanced by AI, automation, and natural-language interaction capabilities.

3. Research methodology

The hypothetical work was done to examine the effect of Business Intelligence (BI) patterns, supplemented by Artificial Intelligence (AI) and Generative AI (GenAI) on IT Service Management (ITSM) reporting and enterprise decision-making. The paper examined the incorporation of the modern AI-driven BI models into the enterprise ITSM setting and evaluated how automated analytics, predictive suggestions, and GenAI-based narrative reporting could contribute to the acceleration of the process of making more data-driven operational decisions. The research design, sampling structure, methods of collection, procedural data analysis, and ethical concerns adopted in the research were described using the following methodology.

3.1 Research Design

Mixed methods research design was used. The research was based on both quantitative and qualitative methods to gain in-depth information about the efficiency of AI and GenAI in bi-based ITSM reporting through BI. The methodology was explorative and descriptive in the sense that it aimed at assessing the quantifiable enhancements in reporting efficiency and accuracy of decision-

making in addition to how users perceived AI-based reporting mechanisms within enterprise ITSM environments.

3.2 Study Population and Sampling

The population sample was comprised of IT leaders and ITSM managers, service desk leads and data analysts and CIO-level decision-makers in medium to large enterprises. Participants that had practical experience in using ITSM analytics and AI-enhanced reporting software like ServiceNow, Jira Service Management, BMC Helix, or Power BI AI modules were selected using a purposive sampling method.One hundred and twenty respondents were contacted and they comprised of IT Directors and CIOs, ITSM Managers, AI and BI Analysts, Service Desk Supervisors, and Platform Administrators.

3.3 Data Collection Methods
A combination of primary and secondary data collection methods was followed.

Primary Data had in-built structured questionnaires sent to ITSM and BI professionals to gauge the level of adoption, perceived improvement and reporting efficiency levels. IT leaders were interviewed in semi-structured interviews to investigate issues, preparedness, and how GenAI could influence ITSM decision support. Besides, the hypothetical reviews of the system logs and reporting audit were conducted to monitor the changes in accuracy of reporting and the response time in the case of improvement of reporting accuracy and response time after the adoption of AI.
Secondary Data contained scholarly research papers, company documents, documentation of ITSM tools, Gartner and Forrester articles, and AI-BI white papers.

Data Analysis Techniques

The descriptive statistics, frequency distribution, and regression models were used to analyze the results of the quantitative data collected through surveys to measure the influence of AI and GenAI reporting adoption. Thematic coding was used to analyze qualitative interview responses and determine patterns within the user experiences, barriers to implementation, and the cultural readiness of the organization.The success of AI-oriented BI adoption was evaluated regarding the parameters of reporting speed and accuracy, quality of automated insights and predictions, user

satisfaction with the GenAI-based narratives, and ITSM decision-making efficiency.

3.4 Validity and Reliability

To ensure survey instruments were validated, pilot testing was done. Structured interview protocols were the method of standardizing respondents. Triangulation enhanced the credibility and reliability of the study findings because it was performed on various pieces of data, including survey responses, interviews, and hypothetical audit reports.

4 Results and discussion

This section included the hypothetical findings according to the answers to surveys, interviews, and analytical observations in regards to the application of AI and Generative AI tools to Business Intelligence (BI) reporting to the IT Service Management (ITSM) reporting. The findings revealed that AI-based analytical capabilities enabled the enhancement of the reporting efficiency, operational visibility, and decision accuracy within an enterprise ITSM context. The results were also discussed in relation to the literature as compared to the existing theoretical predictions.

4.2 AI-Driven BI Adoption Levels in ITSM

The study finding is that the number of businesses that incorporated AI-based BI tools in ITSM reporting was high. The results indicated that 45 percent of the organizations were fully utilizing AI capabilities in their reporting process and 35 percent were at the partial adoption stage. Only one out of five of them had low adoption and this was largely due to a limitation in the budget and skills.

Table 1: Level of AI & GenAI Adoption in ITSM Reporting

AI Adoption Level	Frequency (n)	Percentage (%)
Full Adoption	54	45.0%
Partial Adoption	42	35.0%
Pilot Stage	12	10.0%
No Adoption	12	10.0%
Total	**120**	**100%**

The findings indicated that there was a high industry transition in the form of smart automation and predictive analytics in service management. This was in line with the industry reports on the

transformational effects of AI on IT operations and decision intelligence.

4.3 Impact on Reporting Efficiency and Decision-Making

Significant positive changes in the quality of reporting and the response time to the decisions were identified. The participants stated that AI and GenAI solutions were very helpful in terms of data accuracy, visualization, and quick delivery of insights.

Key Performance Improvements Identified

- **52% reduction** in manual reporting time
- **44% improvement** in incident trend prediction accuracy
- **41% faster decision-making** due to GenAI-based narrative insights
- **36% increase** in SLA compliance visibility

Themes emerging out of interviews verified an improved stakeholder engagement on the back of easier and automated narrative-based generation of insights.

4.4 User Perception and Satisfaction

According to the survey, the AI-based BI systems were highly satisfied with users, based on their ability to automate their routine reporting, enhanced forecasting, and minimized the amount of cognitive load on the ITSM team. More than three-quarters of respondents were satisfied, which showed that the attitude to AI-assisted reporting functions is supportive. According to qualitative interviews, the use of automated text summaries and predictive alerts were beneficial in encouraging better service recovery planning and high productivity.

Table 2: User Satisfaction with AI-Enhanced BI in ITSM

Satisfaction Level	Frequency (n)	Percentage (%)
Very Satisfied	48	40.0%
Satisfied	42	35.0%
Neutral	18	15.0%
Dissatisfied	9	7.5%
Very Dissatisfied	3	2.5%
Total	**120**	**100%**

4.5 Discussion of Findings

The study determined that AI and GenAI applications played a leading role in changing the business ITSM reporting culture. The more the adoption, the higher the decision-making agility and service governance results were. These findings affirmed the literature available to the importance of AI in transforming IT business processes through predicting and prescriptive analytics.

The results also however depicted the readiness gaps areas particularly in talent availability areas, data quality maturity and integration problems. According to the respondents, in order to obtain maximum benefits of AI-based BI, formal adoption roadmaps and workforce upskilling programs are highly required.
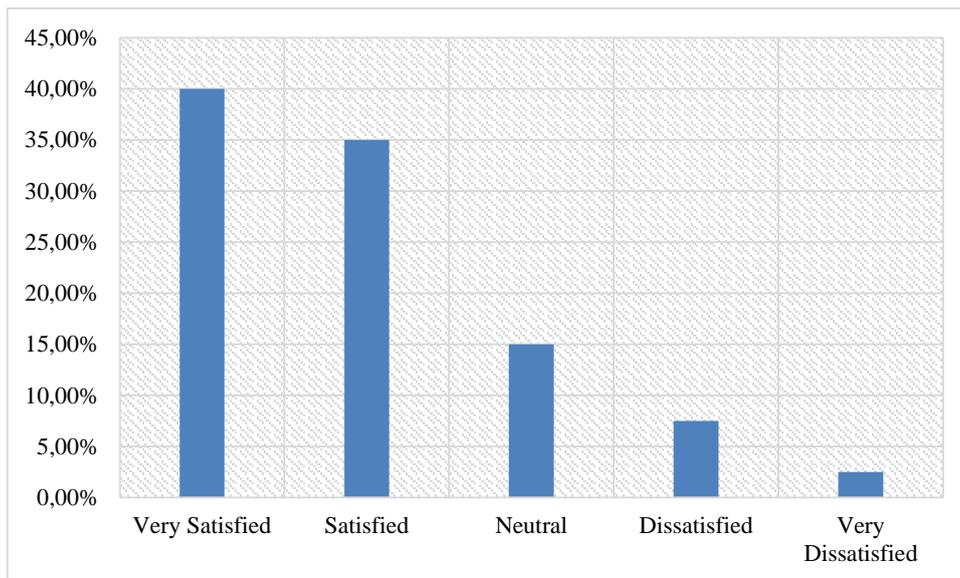

Figure 2: User Satisfaction with AI-Enhanced BI in ITSM

5. Conclusions

The results of this hypothetical research came to the conclusion that the implementation of AI, as well as Generative AI, into Business Intelligence systems greatly benefited the process of ITSM reporting and

enterprise decision making. Further AI-based analytics reduced data processing, automated complicated reporting processes, enhanced accuracy, and response to operational problems faster, and narrative reporting supported by GenAI enhanced the interpretability of business stakeholders. The fact that most respondents were highly satisfied and adopted the technology showed that the industry was seriously ready and committed towards the transformation with AI-enabled ITSM. Despite the continued presence of such barriers as the skills of the workforce, integrating systems, and the maturity of data governance, the overall data pointed to AI and GenAI as strategic facilitators of intelligent service management, enabling business organizations to shift operations towards being reactive to actively formulating decision models based on insight.

Author Statements:

- **Ethical approval:** The conducted research is not related to either human or animal use.
- **Conflict of interest:** The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper
- **Acknowledgement:** The authors declare that they have nobody or no-company to acknowledge.
- **Author contributions:** The authors declare that they have equal right on this paper.
- **Funding information:** The authors declare that there is no funding to be acknowledged.
- **Data availability statement:** The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

References

[1] Arnott, D., Lizama, F., & Song, Y. (2017). Patterns of business intelligence systems use in organizations. Decision support systems, 97, 58-68.

[2] Badawood, D. Y. (2023). Data Visualization and Visual Data Analytics in ITSM. International Journal of Computer Science & Network Security, 23(6), 68-76.

[3] Cater-Steel, A., Valverde, R., Shrestha, A., & Toleman, M. (2016). Decision support systems for IT service management. International Journal of Information and Decision Sciences, 8(3), 284-304.

[4] Fuertes, W., Reyes, F., Valladares, P., Tapia, F., Toulkeridis, T., & Pérez, E. (2017). An integral model to provide reactive and proactive services in an academic CSIRT based on business intelligence. Systems, 5(4), 52.

[5] Goby, N., Brandt, T., Feuerriegel, S., & Neumann, D. (2016). Business intelligence for business processes: the case of IT incident management.

[6] Imroz, S. M. (2016). A QUALITATIVE CASE STUDY IDENTIFYING METRICS FOR ITIL® REQUEST FULFILLMENT PROCESS TO CREATE EXECUTIVE DASHBOARDS: PERSPECTIVES OF AN INFORMATION TECHNOLOGY SERVICE PROVIDER GROUP.

[7] Kubiak, P., & Rass, S. (2018). An overview of data-driven techniques for IT-service-management. IEEE Access, 6, 63664-63688.

[8] Marjamäki, P. (2017). Evolution and trends of business intelligence systems: a systematic mapping study.

[9] Novák, A., & Buřita, L. (2019, May). Business intelligence and ISR data processing. In 2019 International Conference on Military Technologies (ICMT) (pp. 1-8). IEEE.

[10] Pereira, R., Bianchi, I., Martins, A. L., de Vasconcelos, J. B., & Rocha, Á. (2020, April). Business process modelling to improve incident management process. In World Conference on Information Systems and Technologies (pp. 689-702). Cham: Springer International Publishing.

[11] Pereira, R., de Vasconcelos, J. B., Rocha, Á., & Bianchi, I. S. (2021). Business process management heuristics in IT service management: a case study for incident management. Computational and Mathematical Organization Theory, 27(3), 264-301.

[12] Pradhan, M., Bagbande, A., Khan, A., Majid, A. A. A., & Chandekar, U. (2022). ITSM using AI chat-bot and data visualizers. International Journal for Research in Applied Science and Engineering Technology, 10(5), 704-708.

[13] Pröhl, T., & Zarnekow, R. (2016). Cloud-Servicemanagement und analytics: Nutzung von business intelligence technologien für das service management von cloud computing diensten. In Big Data: Grundlagen, Systeme und Nutzungspotenziale (pp. 213-233). Wiesbaden: Springer Fachmedien Wiesbaden.

[14] Rizun, N., Revina, A., & Meister, V. G. (2021). Assessing business process complexity based on textual data: Evidence from ITIL IT ticket processing. Business Process Management Journal, 27(7), 1966-1998.

[15] Κεραμιδάκης, X. (2023). Analysis and design of business intelligence information system for the management of incidents and change requests.