

Finding Enablers and Management Approaches for Achieving Effective Use of Business Intelligence and Analytic System: A Case from Pakistan Telecom Sector

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Abstract

Business Intelligence and Analytic (BI&A) systems have become one of the highest IT/technology spending of the modern organizations all across the globe due to its significance in analyzing the business data. However, despite the growing investments, evidence informs that most of the organizations fail to secure desired benefits from their BI&A systems. Infact, literature shows that almost 70% to 80% of BI projects fail to produce the expected returns for the organizations. The main reason research identified for this failure is the lack of effective use of BI&A systems. Therefore, more research is needed regarding achieving effective use, management strategies & approaches, enablers, and benefits of effective use of BI&A systems. This study addressed these gaps by conducting exploratory case study in one of the prominent telecom organization operating in Pakistan. Data was collected through interviews from the top management, middle management and operational level users of BI&A systems which was then transcribed and analyzed to extract the required information. The findings of the case study identified various management approaches and enablers of effective use of BI&A system. The management approaches regarding the effective use of BI&A system included embedding BI&A system use in routine operations, providing training and development facilities, performance appraisals & rewards system, Setting Up Auto Alerts & Warnings Mechanism etc. Noticeable enablers of effective use of BI&A systems explored through detailed interviews with the respondents include easy-to-use system interface, training & development facilities, appraisals and rewards, effective data management, information quality, ease in investigation & problem solving functions, etc. To achieve high quality benefits from BI&A deployment, the management should adopt effective approaches and formulate effective strategies to ensure the post-implementation effective use of BI&A systems. The enablers explored in this research may help them to plan these strategies accordingly. The findings of this research will help the senior management to effectively plan and ensure effective use of BI&A system in their organizations.

Keywords: Business Intelligence and Analytics, Effective Use, Enablers, Management Approaches, Case Study, Telecom Sector

Introduction

During late 1990s, Business Intelligence (BI) systems emerged as an important tool for organizations to support their decision making activities. BI&A is as an umbrella term that includes applications, tools, infrastructure and the best practices that enable smooth access and analysis of organizational data to enhance and optimize decisions and business performance

(Gartner, 2022). These systems have become an important source of competitive advantage and long-term survival for organizations (Davenport et al., 2012). As a result, BI&A systems have become the leading IT investments in the organizations and have been rated as the top technology priority by the CIOs across the world (Arnott et al., 2017). Recent 'Market and Market' survey informed that BI&A market has comfortably exceeded \$23.1 billion in 2020 and is projected to reach \$33.3 billion by 2025 due to its high demand and impact (Al-Okaily et al., 2023). The major motive behind this drastic increase in BI&A system's investments is that organizations perceive it an important asset to become more competitive, better understand customer needs and quickly respond to changes in their business environment to enhance their performance (Torres et al., 2018). Therefore, BI&A system has become the top priority of the organizations which are aiming to achieve competitive advantage through data-driven decision making (Chamoun, 2023).

However, despite the growing investments and significant expansion of BI&A system's market, a number of organizations have failed to obtain the benefits from the employed BI&A systems (Audzeyeva & Hudson, 2016). Indeed, although the growth of investments in BI&A projects is significant; nearly 85% of them fail (Newman, 2018). Another well-known BI&A consultancy firm Gartner reported that almost 70 to 80 percent of BI projects fail to yield the expected returns (Gartner, 2015) or often result in little or no benefits for the organizations (Yeoh & Popovič, 2016). The major cause of this high failure rate is that the organization ignore the important post-implementation phase. i.e. using these systems effectively after deployment. Since, the organization's motive of achieving high returns from BI&A system investments is highly dependent on the effective utilization of these systems (Ain et al., 2019) which has been ignored in most of the cases. Several studies have highlighted that BI&A system's benefits can only be fully received if the utilization of these systems is effective and BI&A system generated insights are embedded into the functions of decision makers (Al-Okaily et al., 2023; Grublješič & Jaklič, 2015; Grublješič et al., 2019). Recent research has underlined that achieving anticipated benefits from BI&A implementation is a multifaceted task and there is a need to build more comprehensive understanding that how organizations plan to employ the BI&A system more effectively (Burton-Jones et al., 2017; Vidgen et al., 2017; Wee et al., 2022).

Effective use of information systems has come into attention of the researchers quite recently and a complete new knowledge base has been started to build on it. Effective use is different from simple use on the basis that while use is task-oriented and process-based, effective use is goal-oriented and outcome-based (Torres & Sidorova, 2019). It is more focused on the extent to which a system user executes certain actions to attain their goals (Burton-Jones & Straub, 2006) which eventually benefits the organization (Sun & Teng, 2017). But, enhancing BI&A system's effective use is still a challenging tasks managers face nowadays (Grublješič et al., 2019, Trieu et al., 2022). The literature has emphasized that more research is needed to explore necessary measures and approaches developed by management to utilize BI&A systems effectively in the organizations (Ain et al., 2019; Haake et al., 2018; Trieu, 2017). Moreover, the recent studies have emphasized that there is a need to find new sets of contributors, influential determinants, and enablers that affect BI&A system user's effective use patterns (Ain et al., 2019; Grublješič et al., 2019; Popovič, 2017), to achieve better decision-making performance in organizations (Trieu, 2023).

Based on these recent scholarly calls, the current research was focused to answer the questions like the major objectives of deploying BI&A systems in organizations, how do organizations move towards achieving effective use of BI&A systems? What are its enablers and which type of approaches management adopts to move towards effective use of BI&A systems? Which enable the BI&A system users to use it more effectively? And how effective use of BI&A system help the organizations to achieve decision making effectiveness and associated. Hence the objective of this research was to address these gaps by exploring the post-implementation approaches developed by management to enable the effective use of BI&A systems, enablers of effective use of BI&A systems and the benefit of effective use of BI&A systems in the context of telecom sector of Pakistan. Finding of this research would be much beneficial for both – the researchers and the practitioners.

Literature Review

BI&A systems are the set of tools, technologies, applications, and methods that enable organizations to make timely, informed, and effective decisions hence improving the overall business value of the organization. (Davenport, 2014; Grublješič et al., 2019). The literature reports that a German researcher and IBM scientist Hans Peter Luhn first used the term “business intelligence” in 1958. Since then, this phenomenon has remained in practice with different names like Decision Support Systems (Baaras & Kemper, 2008), Management Information Systems (Arnott et al., 2005), Executive Information Systems (Wixom & Watson, 2010), Business Analytics (Davenport & Harris, 2007), Big Data Analytics (Chen et al. 2012), etc. But the main concept and function of BI&A remained the same i.e. analyzing the data to support the decision making process.

BI&A 1.0 - the first age of BI&A, starts from 1970s when the systems like MIS, EIS, DSS, etc got popularity amongst the managers of big organizations (Chen et al. 2012). BI&A 2.0 - the second age of BI&A starts from 1990s and trailed the same pattern till 2010. In this 2nd age, the businesses adopted advanced techniques for data mining and data analytics using structured data and then around 2000 onwards started to analyze unstructured data collected through the internet and search engines like Yahoo, google, etc. (Olszak, 2016). BI&A 3.0 – third age of BI&A starting from around 2010, represents a new revolutionary era of BI&A when its scope was expanded to web and mobile devices (like smartphones, sensor-based internet devices equipped with Radio-frequency Identification (RFID), radio tags, barcodes, data mining, location-based servicing, etc.). The modern trend in BI&A, known as “cloud BI” or “BI services on demand” (Olszak, 2016) represents the practices of providing BI&A services using cloud-based architecture that features lesser costs but faster deployment and greater flexibility (Gurjar & Rathore, 2013). More recently a new revolutionary trend ‘Collaborative BI’ has emerged, which combines BI&A tools and collaborative software to rationalize data-driven decision making.

While BI&A systems were initially used to analyze the data to support decision-making activities, now they are being increasingly employed to improve operational efficiency, strengthen organizational intelligence and learning to creating competitiveness (Trieu, 2017). But, despite all the advancements, the research has less focused on the outcomes of BI&A systems (Llave, 2019) and the impacts of BI on organizational performance (Khan et al., 2020). Particularly, a large gap is yet to be filled regarding the practices that lead towards effective utilization of BI&A systems in the organizations (Ain et al., 2019). It depicts that more research

is needed to help managers achieve the comprehensive benefits of deploying BI&A system in their respective organizations by ensuring effective use of these systems.

Burton-Jones and Grange, (2013) defined Effective as “using a system in a way that helps attain the goals for using the system”. It separates effective use from the term use in a way that use, in general, is task-oriented and process-based, while effective use is goal-oriented and outcome-based, and more focused on the extent to which a user effectively uses the system to attain his/her goal (Burton-Jones & Straub, 2006; Torres & Sidorova, 2019) which then contribute to benefit the organization (Sun & Teng, 2017). Therefore, organizations need to use BI&A systems effectively to achieve quick, smart and effective decision-making capability to beat their competitors. But achieving BI&A effective use is a challenging task faced by the managers today (Grublješič et al., 2019, Trieu et al., 2022). Consequently, the literature highlights that there is a need to find out the appropriate measures and approaches developed by the organizations to utilize BI&A systems effectively (Ain et al., 2019; Haake et al., 2018; Trieu, 2017).

Despite large spending on deployment of BI&A systems recently, the managers are struggling to cope up with the challenge of enhancing its use in the organizations (Grublješič & Jaklič, 2014). Unlike traditional enterprise systems like ERP, CRM, etc. that automate business processes (Mahmood et al., 2023), the real value of a BI&A system is to assist managers in their decision making activities (Phillips-Wren et al., 2021) that need more effective use of this system. Hence realizing the critical role of BI&A systems in effective decision making, Ain, et al., (2019) recommended that as user-centric factors are the key challenges influencing BI&A system use so future research should investigate the approaches management adopts to improve the effective utilization of BI&A systems in the organizations. Recently, studies like Burton-jones et.al., 2017; Phillips-Wren et al., 2021, etc. have stressed to find out more strategies and approaches used by the organization to effectively use such systems. Moreover, the recent studies (like, Ain et al., 2019; Grublješič et al., 2019; Popovič, 2017) have pointed out that there is a need to dig out new sets of influential determinants, contributors and enablers to better explain the user’s effective utilization of BI&A systems, to achieve better decision-making performance in organizations context (Trieu, 2023).

The key objectives of deploying BI&A system in the organizations are to increase decision-making effectiveness (Al-Alwan et al., 2022; Filip et al., 2017) and to improve the quality of decisions (Al-Nimer, 2022; Visinescu, et al., 2017). The complexity of business competition is rising every day. BI&A systems are capable to analyze real time and historical data and hence enable organizations to make data-driven decisions to support strategic planning and operational improvements (Niu et al., 2021). Researchers need to identify its use patterns in organizations; specifically, one aspect quite missing in the literature so far is the effective utilization of the BI&A systems in the decision-making process, which needs to be further investigated (Ain et al., 2019).

Methodology

The purpose of this study was to explore and understand the effective use of BI&A systems in organizational settings as it is a relatively new phenomenon. Relevant studies had recommended to explore and understand it first. Moreover, this study aimed to explore the enablers and the approaches adopted by management to achieve effective use of BI&A systems in organizations, which needed to conduct interviews from the respondents through open-ended questions. So, this study employed the qualitative method and used exploratory case study approach as a

research strategy to examine dimensions of the research problem from various participants. Case study approach is most suitable when a researcher needs to examine a phenomenon in the natural environment and to find out what happened or why it happened (Benbasat et al., 1987; Yin, 2011). Most common sources utilized for this exploratory case study research include interviews, documentation, authentic records & artifacts, and physical observations, as recommended by Yin, (2013). Purposive sampling techniques were used to select the participants. The data was collected from the managers, heads, BI&A system users who were actively involved in utilizing BI&A process and were part of the organization's decision making and strategy formulation activities. A semi-structured interview guide was developed to conduct the interviews for this study. Following are the details of the respondents.

Table 1: Detail of Interviews of Organization A

Respondent	Designation	Code	Experience	Approx. Duration
Respondent 1	Head of Corporate Intelligence & Market Research	AR-1	More than 20 years	1hr. 50min.
Respondent 2	Manager Advanced Analytics, BI, Risk & IT quality	AR-2	Around 10 years	40min.
Respondent 3	Assistant Manager COPs/S&D (Franchise Support)	AR-3	More than 15 years	55min.
Respondent 4	Senior Executive BI Ops. Data Warehouse, BI & Analytics	AR-4	More than 10 years	1hr. 40min.
Respondent 5	Assistant Manager BI & Data Analytics	AR-5	Around 5 years	30min.
Respondent 6	Head of IS Strategy	AR-6	More than 10 years	35min.
Respondent 7	Manager Talent Acquisition & People Services	AR-7	Around 10 years	30min.

Apart from main data collection through interviews, the data was also collected through available documents, observations, discussions, authentic records and the official website of the case organizations. The inductive methodological approach presented by Yin, (2011), was employed for the analysis of current research. Using thematic analysis approach, Yin (2011) presented a 5 steps data analysis framework, which was adopted for analyzing the data of this study. These steps include; (i) Compiling the database (ii) Disassembling the data (iii) Reassembling the data (iv) Interpreting the data (v) Concluding.

CASE STUDY - Organization A

Profile of the Case Organization:

The case organization (Organization-A) was a well rooted telecom company of Pakistan that launched its cellular services in January 2001 in the country. Recently, Pakistan Telecom Authority (PTA) declared this case organization as Pakistan's No.1 voice and data network in its "Mobile Networks Benchmark Report for 2022". According to PTA's Annual Report 2021, the organization also sealed the 2nd highest net adds market share and was amongst the top two operators on Customer Loyalty Measures index. The organization owns over 24 million user base and expanded network coverage in all major urban and rural areas of the country. The

organization is also providing international roaming services at more than 300 live operators in more than 130 countries across the world.

Challenges and Need of Deploying BI&A System:

Organization A was facing massive competitive challenges, and the demand for deploying a dedicated BI&A system was very high. It needed to deal more than 80 key performance indicators (KPIs) for tracking and ensuring performance, over 1 million site variance per day, and around 6TB+ data volume per day for analyzing and extracting the necessary information to feed decision making activities. The organization had various business units and the important decisions had to be made after collecting, mapping, and analyzing the data from different sources. Moreover, the organization had international roaming services across 100+ countries, so the process of accumulating and integrating data was multidimensional and time-taking and the organization had to do it daily. Meanwhile, organization's reach was growing as well with the addition of fastest growing 3G/4G network coverage and adoption of new industry practices.

Moreover, the organization had to expand its cellular services and infrastructure due to the increase of its consumer base to enhance user's experience. More vibrant organizations had also come into competition, so the organization needed continuous monitoring and revising of its business progress to stay ahead in the competition. It needed to launch new products and services to keep existing customers intact and to attract new customers. An alarming situation arose when Annual Report - 2013 indicated that the organization had lost a notable user base due to churn. Therefore, a centralized BI&A system able to gather and integrate insights largely had become essential for the organization.

Objectives of Deploying BI&A System

The organization had lots of consumer data stored on its repositories, which was required to be used for formulating business strategies and making important business decisions across all business units. Similarly, automation and digitalization of business updates and happenings had become an important aspects of implementing data-driven strategy. As the reporting process before deploying BI&A system was manual, lengthy and prone to error so it was badly affecting the business performance of the organization. The management needed BI&A system for a holistic view of the assigned targets to their teams to evaluate their business standing and plan to increase its growth. So multiple set of needs led to the management of the organization towards deployment of BI&A system. Comprehensive interviews unearthed following main objectives for deploying BI&A in organization A.

- Implementation of Data Driven Decision Making Strategy
- Precise & Real Time Business Reporting
- Empowering the Departments and Teams
- Monitoring of Assigned Targets & Business Growth
- Development of New Products & Services
- Expansion of Infrastructure & Network Services

Based on the above mentioned objectives, organization A adopted following BI&A deployments gradually to achieve data analytical capabilities.

Deployment of BI&A System

Prior to deploying BI&A system, various systems were already implemented in organization A to execute different business functions. Convergent Billing System (CBS) was installed to maintain taxation and charging operations. Teradata was implemented to provide data

warehouse services. SAP ERP (ECC 6.0) was in-place to provide integrated and cross-functional business processes since 2007. Though ERP system contained SAP BI module, but it was not being actively used due to some limitations and the organization needed a standalone, dedicated, and complete BI&A system. After comprehensive comparisons and reviews, the organization implemented 'MicroStrategy' – one of market's top BI&A tools, for providing reporting & self-service analytic services during 2014-15. As per agreements, concerned vendor conducted necessary customization, installation and training of the organization's workers and teams. MicroStrategy was implemented over Teradata on the reporting/data extraction layer. This deployment provided the organization important capabilities such as scheduled/automated reporting, dashboarding, real-time business status, etc., which were not available earlier. However, only deploying BI&A system was not sufficient to achieve the anticipated benefits and objectives. The management of the organization had to make sure that the system is also utilized effectively. The rigorous interviews revealed that how and with which approaches the organization moved towards achieving effective use of BI&A system, as explained in the coming section.

Moving from Use to Effective Use of BI&A System

After deploying BI&A, the biggest challenge management had to counter was to ensure the effective use of BI&A system across the organization. Current research was also focused to explore that how organization's management handled this challenge and how they managed to ensure the effective use of BI&A system. The management assessed that marketing, sales, and customer operations, that were already utilizing system generated reports and information for their key activities immediately started utilizing new BI&A tools. While, HR, finance, and technology departments were still not able to align themselves with the new BI&A tools and system. Multiple key position respondents reported that the main reason behind this underutilization was that the workers of these departments were comfortable with their existing working practices and were hesitant to incorporate novelty or innovativeness in their operations.

The management took various measures to make certain that the under-utilizing departments use the utmost capabilities of BI&A system. They introduced data-driven functioning and decision-making culture across the organization to ensure BI&A system effective use. Then they initiated various measures to enable effective use of BI&A system, especially for the departments that were behind utilizing it and to further boost its utilization where it was being used affectively. The next section discusses how and using what approaches the management of the organization moved towards achieving effective use of BI&A system across the organization.

Management Approaches for Effective Use of BI&A System

The important phase for the management of the organization was to ensure BI&A system's post-implementation effective use. As all the activities of its users were recorded, the organization needed to use them effectively to generate business insights. The management was also well aware that this data was of real value if utilized effectively. So, they adopted various strategies and approaches to enable effective use of BI&A system to create knowledge from data for important decision-making activities. Through detailed discussion with the interviewees, following approaches were revealed which the management of organization A adopted to enable post-implementation effective use of BI&A system.

- ✚ Embeddedness of BI&A System in Routine Operations
- ✚ Training & Development Facilitations
- ✚ Developing and Maintaining Goals, Targets & KPIs
- ✚ Setting Up Auto Alerts & Warnings Mechanism
- ✚ Formation of Customer Value Management Team
- ✚ Frequent Meetings & Continuous Monitoring

By using these approaches, the management was able to achieve the effective use of BI&A system significantly across the organization. Similarly, many factors were reported by the BI&A system users of the organization that enabled them to achieve effective use of BI&A system significantly. These enablers of effective use of BI&A system reported by various respondents are highlighted in the next section.

Enablers of Effective Use of BI&A System

Exploring enablers of effective use of BI&A system was one important objective of this study. For higher management of the organization, effective utilization of BI&A system was an important aspect of their strategic business planning. They took various measures to provide an attractive enabling environment to their BI&A system users so that they use it more rigorously and effectively. This question was asked by the respondents frequently to dig out more and more enablers of effective use of BI&A system. Resultantly, following enablers were explored through the rigorous interviews from the respondents of organization A.

- ✚ Dedication Towards Work & Organization
- ✚ Collaborative Culture
- ✚ Easy to Use Interface
- ✚ Availability & Precision of Business Reports
- ✚ Effective Data Management
- ✚ Summarized & Graphical Information
- ✚ Ease of Investigation and Problem-solving
- ✚ Training and Development Initiatives
- ✚ Personal Expertise & Skills Development
- ✚ Performance Recognition & Appraisals

These enablers aided the users to use BI&A system more effectively, as reported by multiple respondents during the interviews. The last section highlights the outcomes and business benefits of effective decision making achieved by the organization by ensuring effective use of BI&A system.

Outcomes/Business Benefits of Effective Use of BI&A System

The organization achieved numerous benefits by deploying and ensuring the post-implementation effective use of BI&A system. It helped the organization to make timely, calculated and effective business decisions which resulted in reducing expenses and increasing revenues. The senior level respondents informed that the main objectives associated with the deployment of BI&A system were achieved comprehensively. The organization attained a significant advantage in bringing precision, excellence, and efficacy in its important business decisions and hence expanded business growth. Recently, the organization clinched Pakistan's number one Voice and Data network nominee in PTA's 'Mobile Networks Benchmark Report for 2022'. In 2022, organization recorded positive Net-Adds of 3.9% YoY growth in its user's

base and captured substantial market share in the telecom sector. In same year i.e., 2022, PTA, declared the organization ‘No. 1 voice and data network provider’ in its nationwide service quality benchmarking. These distinctions came from efficient decision making and management of business operations using BI&A system effectively. The major business benefits achieved by effective use of BI&A system are shown in Figure 1.

The senior level respondents of the case organization informed that the anticipated objectives regarding the adoption of BI&A system were achieved effectively because of management’s effective post-implementation strategies to enable effective use of BI&A system across the organization. The organization was able to effectively utilize huge amount of its consumer’s

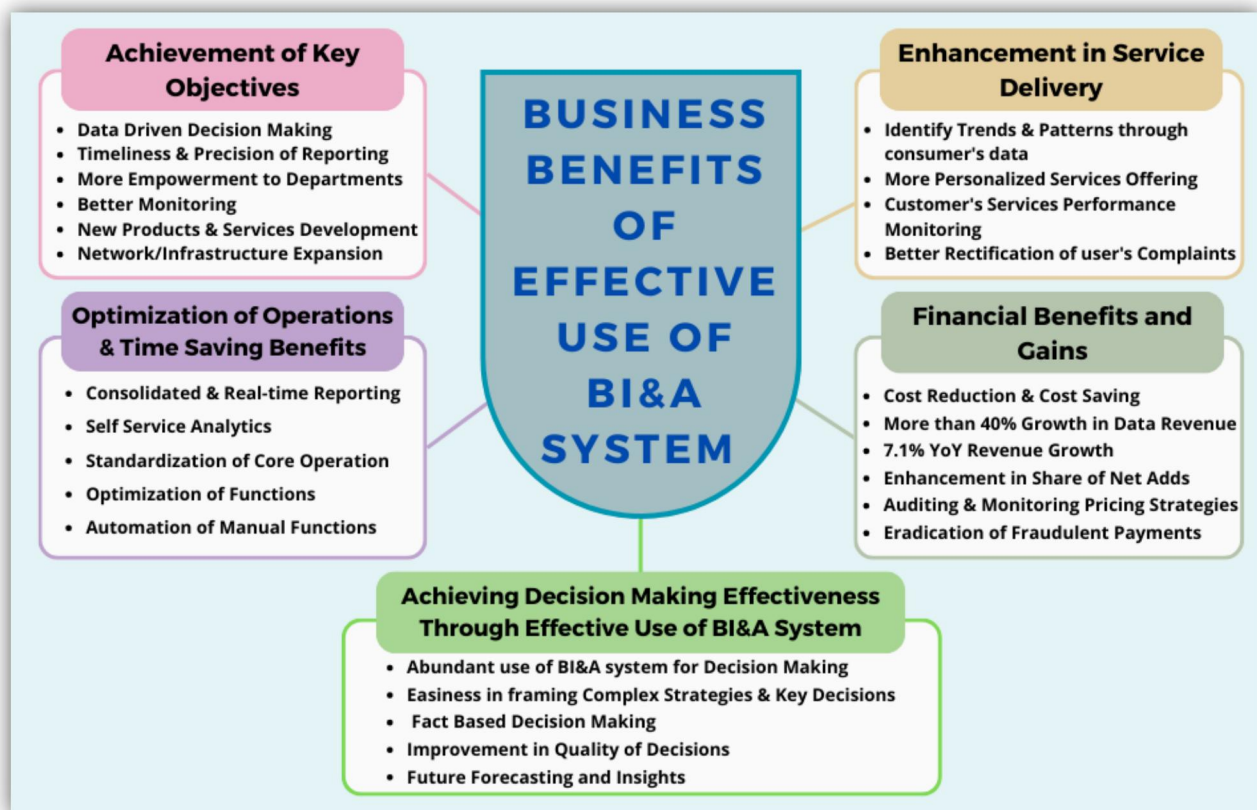


Figure 1: Outcomes/Business benefits of effective use of BI&A system

data to generate future insights, which benefited both – the customers and the organization. The BI&A system enabled the organization to produce updated, easy to understand and analyze business reports. The lengthy process of generating the reports manually using Excel sheets was eliminated. After the effective utilization of BI&A system, delays and limitations of manual reporting got removed and the decision makers were able to get required report timely and accurately. Rigorous interviews, reports and observations evinced that the major objectives of using BI&A system in organization have been achieved extensively and the decision makers were satisfied with its performance output. Making informed, calculated and data-driven decisions was the highest anticipated need of deploying BI&A system in the organization. BI&A

has supported the organization significantly in making informed business decisions. The respondent informed that the organization achieved excellence in decision-making activities by using BI&A technologies effectively so well that they started monetizing “Designing dashboards and reports to enable data-driven decision making” services to other businesses. New offers, packages – area/region-based, market segment-based, gender-centered, use pattern-based, etc., are planned and launched using analyzing reports generated by BI&A system. Another key challenge management facing was to make quality decisions before deploying BI&A system. Effective use of BI&A system has helped the managers not only to resolve current issues promptly but they got the capability to make quality future forecasting as well. For conducting predicting analysis, they developed good and reliable dashboard models using BI&A system effectively. The high management respondents informed that the success rate of their predictive dashboard is around 69% which is rated as exceptional. As, above 50% success rate by a predicting model is rated as very good. Using BI&A system effectively, the organization recently launched a unique service of observing real time geographical location of their users and sending them sales campaign in collaboration with different brands, located in that particular area. This is how the organization built significant enhancements in its decision making process which were then transformed into generating growth and revenues for the business.

Another milestone achievement of BI&A system based decision was the launch of Super Card with very famous slogan narrated as “No worries for the whole month” as it contained all three basic services i.e., call, data & sms, customers needed for whole month in a single price package. This successful product was developed and launched after doing precise calculations and thoroughly analyzing the customer’s use patterns using BI&A system effectively. It was so successful launch that the organization won the Silver Effie Award for “Sustained Category” in 2019, on introducing Super Card successfully. Another exclusive example of effective use of BI&A system informed by the respondents was the organization’s major decision of refunding around 20 million rupees on incorrect deduction of account balance while using WhatsApp service. The background of this example was that the customer’s complained that despite having a pre-activated internet bucket, their account balance got drained automatically while using internet/data services. It was a strange issue faced by the customer services team of the organization. So, using BI&A system, they generated various reports about this issue, analyzed them and found that WhatsApp use being charged from main account balance not from the activated bucket. They made necessary rectifications in the system and took corrective measures so that it may not happened in future. So, the BI&A system provided real-time operational insights to the managers which enhanced their everyday decision making performance related to customer services, production planning, and quality controlling.

BI&A system has provided the managers self-service BI facility which has enabled them to automate manual activities and quickly generate their required reports rather than waiting for IT or data analysts for that job. The BI&A system has also empowered the managers to monitor their services performance; enabled them to identify improvement areas and then introduce necessary enhancements in the service delivery. It has facilitated the organization to maintain high service quality and hence improve customer satisfaction. Resultantly, the organization has displayed great advancements in data services sector. According to annual report 2021-22, despite the challenging operating atmosphere the organization ended the fiscal year on a high note by attaining a 4.3% YoY revenue growth mainly driven by data services. The

organization observed 80% growth in the 4G net adds and achieved 2nd highest 4G net adds market share in 2021, which resulted in 15% growth in 4G active base. Data-oriented new offerings and launches resulted in producing more than 40% growth in data revenue in 2022.

Meanwhile, BI&A system helped the organization to control revenue leakages by detecting and preventing fraudulent activities through analyzing transactional data for anomalies and patterns that indicated fraudulent behavior. Using BI&A system effectively, recently sales team detected and neutralized the fraudulent activity of registering sim cards on fake biometric entries. Fake sim registration was lethal for the organization as it has to pay both the franchise and the government against each register number. As there exists no actual customer behind the fake registered sim so it is a complete revenue leakages source for the organization. A BI team of the organization developed a special purpose interface of the BI&A system to generate reports informing about daily sales and specifically at which franchise/sale point the sale was high. This BI&A interface reported that around 250 new registrations were recorded on a particular franchise on female's national identity cards at around midnight, which was evidently impossible. The fraud detection team got activated and this fraudulent activity was caught by them using BI&A system effectively and hence saved revenue leakages for the organization.

The above discussion and examples reported by the respondents reveal that the organization got enabled to make quality decisions, achieve their anticipated objectives and consequently generate revenues through effective use of BI&A system. Resultantly, the organization was able to achieve growth, progress, its targets comfortably.

Discussion and Finding

BI&A system has become a major necessity of the organizations for making data-driven and calculated business decisions (ForouzeshNejad, 2023). Organization-A was also facing enormous challenges which eventually lead it towards the deployment of a dedicated BI&A system in 2014-15. The organization linked various goals and objectives with the deployment of BI&A system which were challenging it. The main objective of the organization associated with BI&A system was the implementation of data-driven decision making strategy. BI&A system is vital for organizations around the world for providing them a more factual information in their process of making significant decisions and to infer valuable insights (Armour, 2019; Khan et al., 2021) and a data-driven approach specifically to telecom organizations to control customer churns (Zhang et al., 2022). Rikhardsson & Yigitbasioglu (2018) reported that the support of accurate and timely data presentations generated using BI&A system leads towards improved decision making quality. Similarly, leveraging BI&A systems is crucial to enhance the management control and business performance in the organizations (Elbashir et al., 2022). Therefore, these key aspects were of highest value for the organization and they were keen to get control on these aspects by deploying and effectively utilizing BI&A system.

However, the achievement of all of these objectives and expectations associated with BI&A system were largely dependent on how well and effectively it was utilized. The management of organization-A employed various approaches to achieve the effective use of BI&A system. First of all, the management made BI&A system the central part of all the important activities of the organization like development of products & services, monitoring of progress & goals, for making key decisions etc. Certainly, BI&A systems are considered a potential source of competitive advantage for the organization, but their benefits can only be fully grasped when utilization of these systems becomes deeply embedded into the routines of

the users (Grublješič, & Jaklič, 2015; Grublješič, et al., 2019). The management of the organization built a well-organized mechanism to ensure effective use of BI&A system by generating reports and insights for presenting in frequent meet ups to analyze and monitor business progress. Because BI&A system allows managers to make fruitful decisions using real time data, by analyzing the masses of data, supervising functions, and monitoring different variants of organizational performance (Olszak & Ziemia, 2007). These meetings were not only used to monitor ongoing progress but also to develop and allocate multiple short/long term goals and targets to the teams according to the need of the organization. The organization's goal of achieving high returns of investments is highly dependent on the effective utilization of BI&A systems (Mudzana & Maharaj, 2015). The organization developed many KPIs to map its progress with the best practices of the industry. As, the use of BI&A systems is more innovative and research focused (Grublješič, et al., 2019), it helped the organization to find novel ways of achieving its targets. Similarly, management developed and used various approaches to enable the effective use of BI&A system across the organization.

An important objective of this research was to uncover the enablers which enable the effective use of BI&A system. Management of organization-A provided a good enabling environment to its workers so that they could make data-driven decisions and activities using BI&A system effectively. Scrima et al., (2021) have also argued that effective employee engagement at workplace and the development of a strong relationship between workers, managers and employer help to enhance work performance. The detailed case study revealed multiple enablers like Collaborative Culture, Effective Data Management, Training and Development Initiatives, Skills Development, Performance Recognition & Appraisals etc. which helped the BI&A users to use it more passionately and effectively. The detailed discussions with the respondents of organization-A highlighted that the objectives regarding deployment of BI&A system were achieved effectively.

The organization achieved many benefits after the deployment of BI&A system and ensuring its post-implementation effective use. According to PTA's 'Mobile Networks Benchmark Report for 2022', the organization-A emerged as Pakistan's No. 1 Voice and Data network in Pakistan. The organization achieved optimization of operations which helped to save precious time and energies of the higher management while making key decisions. The organization witnessed a great enhancement in service delivery to its customers. The most anticipated need of BI&A system in the organization was for making decisions across all levels of the organization. As BI&A systems empower the organizations to generate robust insights that can inform strategic, tactical, and operational decision making, along with performance management and risk management (Bischoff et al., 2015). The higher management had placed data-driven decision making an important part of their organizational strategy so it created fruitful results for organization in this aspect. The organization became highly dependent on BI&A system, its reports, visualized and summarized views while making important decisions. The impact of summarizing and visualizing important information is significant in improving the decisions of the management (Khatri & Gupta, 2022). With the removal of anomalies and errors from the reports, BI&A system became the most important tool for the organization to achieve the quality of decisions. Overall, the decision making process got major improvement which has been then converted into growth and revenues for the organization. The effective use

of BI&A system enabled the organization to achieve its KPIs, met its organizational commitments and received lots of intangible and value creating benefits.

Conclusion and Future Direction

Modern businesses are well aware of the fact that they need to utilize their business data and information effectively to stay competitive. Technological solutions like BI&A have become highly significant for the organizations to make timely, calculated and fact-based decisions to enhance their business performance (Trieu, 2017). Recently, Kappelman et al. (2020) has reported that BI&A has become one of the largest organizational investments on business IT technologies. Therefore, it has become evenly important for organizations to use this system effectively (Abouzahra & Ghasemaghahi, 2022). But the literature highlights that these systems are not used to their full potential resultantly the organizations fail to benefit from its maximum advantages. Owing to this literature call, this research was conducted to explore the leading factors and management approaches through which the organizations could achieved full potential and effective use of BI&A systems.

The case study for this research was conducted in a telecom organization providing cellular services in Pakistan. The main challenges, needs and objectives of deploying BI&A system were explored through interviews. Then the post-implementation process of BI&A system in case organization was rigorously analyzed to know how organization moved from its use towards effective use. To know that, type of approaches/strategies the management of the organization adopt to effectively use BI&A system in their organizations were explored. More essentially, the factors that enabled the organization's users to use BI&A system more effectively were rigorously researched. Resultantly, multiple management approaches and enablers for effective use of BI&A system were revealed which are comprehensively outlined in the case study section. Some enablers like easy-to-use system interface, training & development facilities, appraisals and rewards, effective data management, information quality, etc., were the factors in-line with previous studies and famous theories like TAM, UTAUT, ToEU, etc. Then few novel enablers of effective use of BI&A systems like Ease in investigation & problem solving functions, Dedication Towards Work & Organization, Availability & Precision of Business Reports, etc. were revealed in this research.

Effective management approaches and providing enabling environment collectively enabled more effective use of BI&A system in the case organizations that provided it multiple benefits. To outline the benefits of effective use of BI&A system, two main aspects were focused according to the recommendations of previous studies focused on BI&A system's benefits. First, finding the extent to which the management of the case organizations was able to achieve the main objectives of deploying BI&A system, and second was to explore how their decision making process got improved and consequently what types of benefits they achieved. The study explored that deployment and effective use of BI&A system brought multiple benefits to the organization like Optimization of operations & time saving benefits, quick-efficient-effective reporting, decision's quality enhancement, better service delivery, launching innovative digital products, services and offers, data monetization & analytical capabilities outsourcing, financial gains, business expansion and sustainable growth with precise decisions using BI&A system effectively.

This study is conducted in the telecom sector of Pakistan as the use of BI&A system is very vibrant in this industry. Further research can expand its scope to other business sectors

and industries as well. This research has focused on a novel phenomenon – ‘effective use’, and explored it in the context of BI&A system. This novel area of interest may be studied for other ISs like ERP, CRM, EMS etc., as well. It would help managers to understand and instigate the effective use of ISs deployed in their concerned organizations. Moreover, literature has suggested to explore and operationalize new constructs for this new developing area of interest i.e. effective use of ISs. Current study has revealed few novel factors that can be operationalized and empirically examined in future.

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