

Exploring the Effects of Digital Transformation on Employees' Performance Management Systems of the Telecommunication Industry in Bangladesh

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How to cite this paper: Islam, M. T., & Hossain, T. (2024). Exploring the Effects of Digital Transformation on Employees' Performance Management Systems of the Telecommunication Industry in Bangladesh. *Journal of Human Resource and Sustainability Studies*, 12, 289-314.

<https://doi.org/10.4236/jhrss.2024.122016>

Received: March 19, 2024

Accepted: May 15, 2024

Published: May 18, 2024

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Abstract

This study examined the effects of digital transformation on employees' performance management systems in the Bangladeshi telecommunications industry. Using both primary and secondary data, the study sought to comprehend the evolution of digital performance management and its impact on competition. Two hundred employees from Bangladeshi telecommunications companies filled out a questionnaire for the study, and interviews were conducted to obtain additional insight. The findings indicate that digital transformation improves performance management systems, workforce performance, and sustainability. Respondents concurred that digital tools could potentially automate numerous performance management system functions. The implementation of digitalization enhanced operations, productivity, and process management. Employees have also expressed support for digital access to performance-related data. The research identified several drivers of digital transformation in performance management systems, including managerial and operational capabilities, the development of digital skills, and innovation capabilities. Respondents noted that digital performance management facilitates effective communication, enables employees to participate in evaluations, improves objectivity and precision, and provides timely feedback. It was discovered that digital performance management systems reduce costs by rapidly identifying performance issues and eliminating inefficient practices. In addition, they contributed to enhanced productivity, innovation, employee retention, and talent attraction. Cloud-based performance management systems were especially effective at attracting a diverse talent pool. With a Cronbach's alpha coefficient of 0.877, the research instrument employed in the study exhibited high levels of internal consistency and reliability.

ty. The findings of the study indicate, overall, that implementing digital performance management solutions has the potential to confer long-term competitive benefits onto the telecommunications industry in Bangladesh.

Keywords

Bangladesh, Digital Transformation, Performance Management Systems, Telecommunication Industry

1. Introduction

Because of the enormous potential and widespread usage of digital technologies in recent years, businesses have been driven to gain long-term competitive advantages and improve their capacity to capitalize fully on the opportunities presented by digital transformation. However, the complexity and inadequate knowledge of the methods of digital transformation may be obstacles to the performance of businesses, making it easier to address the problems of digital transformation by taking functional, operational, and strategic measures. It is still being determined which technologies, tactics, and skills will be needed in digital transformation to achieve long-term competitive performance and sustainability. Furthermore, there needs to be precise strategic approaches to the full exploitation of digital transformation to improve the sustainability performance that has been developed (Nasiri, 2021). Today's organizations are facing extreme transitions because of the drastic advancement of technology (Colbert et al., 2016). Organizations are searching for a way to digital conversion in every phase of organizational effort to enhance effectiveness. Performance Management System (PMS) is measured as the most crucial part of an organization's Human Resource Management (HRM) practices. Contemporary organizations are extracting competitive advantages by translating effective performance management systems that match employee performance to the organization's strategic mission and vision. The market value of manual performance management models is becoming poor. The traditional PM systems, where decision-making around compensation, career advancement, job security, and other compliance-mandated functions are assessed, have become obsolete in enhancing employee performance or management. They do not add value to the business (Schrage et al., 2019). PMS helps cultivate a culture wherein employees can attain opportunities and support for improved performance and give their best for the sake of the organization's goal achievement. According to Faugoo (2009), attracting talent, acquiring the best, enhancing timely competencies, encouraging creativity, and retaining competitive performers will be the best way for a firm's sustainability in the modern business world. She explained that performance management is largely related to competitive advantage and HR practices are significantly co-related to Organizational overall performance (Faugoo, 2009). Digitalization makes a brand image to attract talent, ensures employee

loyalty, enhances empowerment, and accelerates redesigning new roles in employee management (Schalk et al., 2013).

Digital transformation is the main factor in the drastic conversion happening around us. The telecom industry differs from this, and huge changes have already occurred. This business is regarded as the key trigger for global evolution. The various technological breakthroughs, from the arrival of 5G to blockchain development, are evidence of digital transformation in the telecommunications industry (Gharib, 2009).

Still, there are many scopes of study to know how best to capitalize on the digital practices essential for entering the new digital transformation era in telecommunication companies. Researchers are focused on discovering the most feasible ways for a fruitful digital transformation in telecommunication companies. This paper will try to understand the relationship between Digital Transformation (DT) in Performance Management Systems (PMs) and sustainable competitive advantages for an organization. The research assessed the existing usage status and its potential for Digital conversion of PMs, concentrating on every phase of the PMs cycle: employee data management, feedback, Green Performance Appraisal, performance evaluation, competency development, reward, and its value as sustainable competitive advantages for Telecommunication Companies operating in Bangladesh. Therefore, this study tried to address the above issues, the questions of managing the digital transformation of PMs.

To conclude, in today's digital age, the pace of transitions is growing at an unprecedented rate (Bititci et al., 2012; Nudurupati et al., 2016), and digitalization is accelerating these changes to present organizations with new chances (Kohtamäki et al., 2020; Nudurupati et al., 2016), smart technologies (Fichman et al., 2014; Hinings et al., 2018; Yoo et al., 2012; Yoo, 2010), digital business strategies (Bharadwaj et al., 2013; Hess et al., 2016; Matt et al., 2015), and digital-related capabilities (El Sawy et al., 2016; Hess et al., 2016; Li, 2018; Vial, 2019) are needed to achieve sustainability performance in this competitive business environment (Büyüközkan & Göçer, 2018).

Many firms lack an effective digital transformation strategy (Fischer et al., 2019; Jackson, 2019; Li et al., 2018; Tekic & Koroteev, 2019). This dissertation examined digital transformation performance management methods. Two primary study questions were given to accomplish this.

- 1) Does digital Transformation in the performance management systems influence employee performance?
- 2) What is the role of digital transformation in PMS for employee performance?

Research Objectives

The principal objective of the research is to know the effects of the digital transformation of PMs in the Telecommunication industry of Bangladesh.

Specifically, the study seeks:

- To assess the drivers of Digital transformation in PMS of the Telecommunication Industry.
- To understand the influence of Digital Transformation on the Performance Management Systems of Telecommunication companies operating in Bangladesh.
- To find the implications of digital transformation in PMs in different Telecommunication companies operating in Bangladesh who have already installed Digital means in PMs.

2. Literature Review

Any business may feel the repercussions of digital transformation, and it can be quite a challenge in and of itself. Alterations in product offerings and distribution methods are just two examples of these consequences. Major company processes, organizational structures, and whole business models may all change, as can the perspectives of management (Berman, 2012; Hess et al., 2016; Li et al., 2018; Matt et al., 2015).

Hess et al. (2016) and Matt et al. (2015) state that a digital transformation framework must incorporate technology, structural reforms, new value generation, and finances to assess a company's capabilities and develop a plan. Technology utilization refers to a company's methods for utilizing and researching digital technologies. Digital technologies need major changes in a firm's structure, procedures, and skills. Digital transformation affects new value creation. Lastly, financial elements address corporate possibilities and financial capability for digital transformation (Hess et al., 2016; Matt et al., 2015). El Sawy et al. (2016) and Kane (2016) prioritize strategy, culture, expertise, and skill building above technology.

In this study, "digital transformation" refers to a process brought about by digital technology, which is dynamic due to frequent changes in business plans, company capabilities, digital representation features, and competitive advantages.

There is no doubt that performance management is an essential part of the success of an organization (Cardy, 2004). PM may be defined as a process that confirms that employees are working hard to achieve the mission and goal of the organization (Gruman & Saks, 2011). Performance Management (PM) is a core business practice for most organizations, whether formally executed through an official organizational method or informally administered through daily discussion (Brown et al., 2017). According to Ahmed (2012), performance management is a continuously updating method of recognizing, evaluating, and enhancing employee performance and blending performance metrics with the organization's strategic mission. Performance management, therefore, can be considered a systematic and integrated tactic to confirm the attainment of the strategic purpose of an organization through the constant development of performance (Dominic, 2018). Again, Employees clearly understand the quality and

quantity of work expected of them; employees get ongoing information about how effectively they are doing relative to expectations; awards and salary increases based on employee performance are distributed accordingly (Zhang, 2012).

Korsakienė (2012) states that competitive advantages mean positional and performance advantages compared to the market competitors held and distributed resources and capabilities advantage. So, the competitive advantage can be defined as an important capability over its competitors because of the cost distribution and the consequences of the functions, which depend on the market positioning strategy. Competitive advantage is attained when an organization improves, or gains features that permit it to outperform its competitors. Competitive advantages have drawn the vital concern of HR experts and the overall management community (Wang, 2014).

2.1. Digital Transformation of Performance Management

Digital transformation is the care and continuing digital progress and adaptation of an organization, business remodeling, knowledge, skills, systems, or methodology, both strategically and technologically (Mazzone, 2014). Westerman et al. (2011) define digital transformation (DT) as the utilisation of technology to significantly improve an organization's overall performance. Executives in all departments are using digital means such as analytics, mobility, social media, and smart embedded devices and refining their existing technologies such as ERP to transform customer handling systems, work strategies, and enhancement of organizational value.

The effectiveness of traditional performance management systems is being questioned. This legacy system can support decision-making around employee benefits, career advancement, punishment, and other regulatory compliance-related issues. It has become inappropriate to enhance employee performance or its management. It is unable to add value to the organization. Organizations in every industrial sector recognize the urgency of a new employee performance management system to compete and sustain success in this digital revolution. A technological breakthrough, the changing characteristics of work, and digital transformation all emphasize and create a new urge for fair PM methods. Strategic execution of bias-free honest PMs is critical in this emerging digital business environment. The future of digital performance management is an indispensable module for installing successful digital transformation (Schrage et al., 2019).

The digital revolution in society has helped governments get better, more accurate, and timelier data, which has caused a decrease in corruption, more transparency, and higher revenue growth while lowering costs (ElMassah & Mohieldin, 2020).

When a company implements a value-creating strategy but is not matched by rivals, we may argue that the company has a competitive edge. If no rivals are

able to replicate the advantages of a value-creating strategy, and when any existing or prospective competitors are not using the same approach, we may claim that the company has a prolonged competitive advantage (Barney, 1991).

Usually, competitive advantage is achieved through productivity, research, and development of resources, monetary resources, product distribution, and economies of scale. These components are still relevant but insufficient for success in today's business environment. Employees are the prime assets in the competitive business world, and other resources are nothing more than supplies that can be taken at market prices, but only the human resources can improve themselves and contribute more to the organization's success (Fitz-enz, 1995).

To get a competitive edge, focus on improving the use of human resources. For those concerned about a business's competitive edge, the resource-based perspective of the firm offers a framework for evaluating company policies and rules around human resources (Boxall, 1996).

Rudman (2003) states that PMS is considered the incorporation of HRM functions and the Organization's purpose, in which HR practices and authority work together to influence the team and individual behavior and to care about the organization's strategy. Rudman (2003) also claimed that PMS is an integrated and completed cycle for handling employee performance. So, it needs to fit in with the organizational culture. It entails that PMS can improve organizational performance, which can be attained by enhanced employee performance (Macky & Johnson, 2000). Moreover, Zhang (2012) pointed the major purpose of PMS is to guarantee that—the work efforts given by the employees achieve the desired performance of the organization; employees have a clear picture of the role expected from them; employees get continuous feedback about how well they are doing compared to expectations; compensations and other benefits increase based on employee performance are given fairly; opportunities for career and skill development are recognized, and poor performance that does not meet the standard is identified and treated accordingly. However, Lawler (2003) proposes that PMS aims to inspire employees to their best performance, enhance skill development, create a healthy performance environment, discover employee career advancement opportunities, eradicate poor performance, and support executing organizational strategies.

Many researchers have emphasized that expert managers believe acquiring and building the right performers is one of their major concerns and that their organization's human capital is one of their most valuable intellectual assets. Still, some organizations are considering establishing a system to evaluate employees' value and performance (Lawler, 2009).

A vital part of the success of a contemporary organization is its capacity to grab the benefits of all available information. Controlling an enterprise's continually growing bulk of internal and external information is difficult. Many organizations are concentrating on skills and competencies; consequently, many employees require access to a larger diversity of information to be successfully operative. Organizations are investing in technology to control information re-

dundancy and to gather knowledge that can be integrated for competitive advantage (Cody et al., 2002).

Many researchers try to determine how an organization can gain a competitive advantage through the most important resources i.e., Human Resources around the world. Schuler identified major HRM practices like Human resource planning; staffing, including recruitment, selection, and socialization; Employee performance evaluation; employee benefits; Training and development, and industrial relationships that must be followed to control human resources magnificently. Efficient management of human resources can increase the capability to fascinate and hold good performers who are devoted to doing their best. Having the right staff dedicated to performing leads to a competitive advantage (Schuler & MacMillan, 1984).

Modern organizations are realizing that competing successfully in digital business atmospheres requires a new method to the performance management system (Hossain et al., 2022). The modern PM is more information-centric, more accessible, more continuous, and more progress-oriented. It is concerned with individual employee performance, skills, and teams. Performance management's aim is changed, physically and intensely. Technology makes this change possible. With the explosion of digital mechanisms designed to enhance employee performance, successful organizations use PM to improve performance, grow skills, and hold valued performers. For these organizations, the core of performance management is performance, not regulation compliance. HR experts must recognize how to balance past performance evaluation with the continuing necessity to improve employee skills and competencies (Hossain et al., 2022; Schrage et al., 2019).

Due to the vast number of changes in business processes and methods (Kohtamäki et al., 2020), digital transformation involves fundamental transitions not only in the types of technologies and strategy (Fichman et al., 2014; Yoo et al., 2012; Yoo, 2010) but also in companies' capabilities (Berman, 2012; Kohtamäki et al., 2020; Vial, 2019). Several academics have emphasized the significance of human capability, collaborative capability, innovation capability, and technological competence in digital transformation (Berman, 2012; Büyüközkan & Gocer, 2018; Hess et al., 2016; Vial, 2019). These competencies together reflect digital-related capabilities. Digital transformation through digital-related capabilities is related to the sustainability performance of companies in areas such as innovativeness (Hess et al., 2016; Jackson, 2019; Svahn et al., 2017), financial performance (Bharadwaj, 2000; Karimi & Walter, 2015; Kohtamäki et al., 2020), firm growth (Berman, 2012; Setia et al., 2013), reputation (Berman, 2012), cost reductions (Hess et al., 2016).

Digital transformation through human capabilities can support the attainment of sustainable competitive advantages, such as a rapid and accurate decision-making process (Bharadwaj et al., 2013; Büyüközkan & Gocer, 2018; Vial, 2019), the ability to rapidly develop business solutions (Byüközkan & Gocer, 2018; Dremel et al., 2017), profitability (Berman, 2012), and social sustainability

(Berman, 2012; Vial, 2019). Human capabilities, such as employee support, preparedness, and advanced digital skills, may ease and speed decision-making (Bharadwaj et al., 2013; Hess et al., 2016) and enable a faster reaction to complex business situations (Dremel et al., 2017). Moreover, staff workers who are well-trained in the use of digital technologies may readily support remote working, which promotes social sustainability performance via flexible working hours and employee comfort (Pramanik et al., 2019) and environmental sustainability through decreased commuting and travel for work (Bekaroo et al., 2016). Also, it is less difficult to operate in an atmosphere where people are willing to adopt and accept digital procedures that facilitate innovation and corporate success (Berman, 2012). In a digital supply chain, the capacity of workers to effectively utilize data may assist businesses in projecting future demand, developing decision-making processes, and identifying solutions to unsolved problems (Büyüközkan & Gocer, 2018).

As stated by Fischer et al. (2019), businesses need professionals who possess digital competence and are motivated to bring about economic, social, and environmental benefits in the face of increasingly complex job requirements.

Digital transformation through collaboration capabilities (Büyüközkan & Gocer, 2018; Vial, 2019) can help sustain a company's performance in terms of efficiency (Vial, 2019), social sustainability (Büyüközkan & Gocer, 2018; Berman, 2012), resource consumption efficiency (Büyüközkan & Gocer, 2018), customer satisfaction (Berman, 2012), and relationship performance (Büyüközkan & Gocer, 2018). For instance, stakeholder and consumer cooperation via digital media may increase a company's profitability through customer participation and engagement (Setia et al., 2013). In addition, a company's success is enhanced by its capacity for cooperation through the exchange of internal and external resources and expertise (Li et al., 2018).

Based on Berman's research in 2012, it was found that involving customers and communities in all aspects of the business process, including marketing, sales, supply chain management, product design, human resources, finance, and IT, can set companies apart from customer-centric businesses. Furthermore, effective management of digital operations relies heavily on communication through digital channels and seamless connectivity across consumer touchpoints. Various digital and social channels increase customers' expectations, and social channels are expected to consistently provide unique user experiences to promote reputation, branding, and customer satisfaction.

2.2. Research Gap

The existing literature lacks comprehensive research on the dynamics of digital transformation in employees' performance management systems in the telecommunications industry in Bangladesh (Rahman et al., 2021). This study aims to fill this research gap by examining the various aspects of this phenomenon and its impact on employee performance.

Lack of Focus on Bangladesh: The current body of research on digital transformation and performance management systems primarily focuses on Western contexts, failing to sufficiently acknowledge the distinct circumstances and obstacles encountered by emerging economies like Bangladesh (Rahman et al., 2021). This study aims to provide valuable insights into the unique challenges and opportunities faced in the telecommunications industry of Bangladesh, addressing a gap in existing research.

Insights into the Telecommunications Industry: The telecommunications industry is known for its impressive technological progress and its crucial role in enabling communication between people and businesses (Anderson, & Patel, 2021). This study seeks to fill a void in current knowledge by providing specialized insights that have been previously neglected.

Employee-Focused Viewpoint: The current body of research on digital transformation tends to place a strong emphasis on technological aspects, often overlooking the vital employee perspective (Smith et al., 2020). There is existing information on this topic, but there is still a lack of understanding regarding how digital transformation affects employees and their experiences in organizations. Therefore, it is important to shift the focus of academic inquiry towards investigating the aspect of digital transformation that revolves around employees. This will help us develop a thorough understanding of its consequences (Kane et al., 2016). This study will primarily investigate employees' perceptions, attitudes, and experiences in the context of performance management during digital transformation.

2.3. Conceptual Framework

Organizations with capabilities and resources to prevent upheaval benefit from inertia (Svahn et al., 2017). Many organizations depend on their present connections with consumers and suppliers via conventional channels, inflexible and efficient manufacturing processes (Andriole, 2017), and static resources that cannot be rapidly adjusted (Kohli & Johnson, 2011; Woodard et al., 2013). Through a strategy process and core competencies in organizational capabilities, a performance measurement system may reduce the limiting effects and enable new capabilities and resources (Chenhall, 2005; Dossi & Patelli, 2010; Franco-Santos et al., 2007), allowing enterprises to gain lasting competitive advantages (Franco-Santos et al., 2007).

Organizations will have everything they need to boost profits by increasing employee performance, thanks to digital performance's creation of an environment of transparency, continuous feedback leading to employee engagement by loyalty, motivational feedback and recognition, career path, and professional development, and a revamped process for accurate and meaningful appraisals (Tabassum & Ghosh, 2019).

In conclusion, using a performance assessment system in digital transformation may allow managers to compare organizations across locations or optimize

product production capacity more accurately, which would be impossible without digital technology and facts (Westerman et al., 2014). The external environment's volatility affects a firm's strategy and performance assessment system, making digital transformation difficult (Bititci et al., 2012; Melnyk et al., 2014; Nudurupati et al., 2016). Performance measurement systems and sustainability agendas may assist managers in understanding their environmental, social, and economic resource efficiency and specific goals (Gates & Germain, 2010; Searcy, 2012). Consequently, a performance assessment system may be used as a strategic instrument in digital transformation, together with digital-related competencies, a digital business strategy, and smart technology, to improve company sustainability (Büyüközkan & Göçer, 2018; Nudurupati et al., 2016).

The study proposed the following model to reach its ultimate results. However, the model is based on the above literature (Figure 1).

The above conceptual framework is inspired by the framework developed by Nuryanti, Samir, & Andreas (2018). Their framework is as follows: Figure 2.

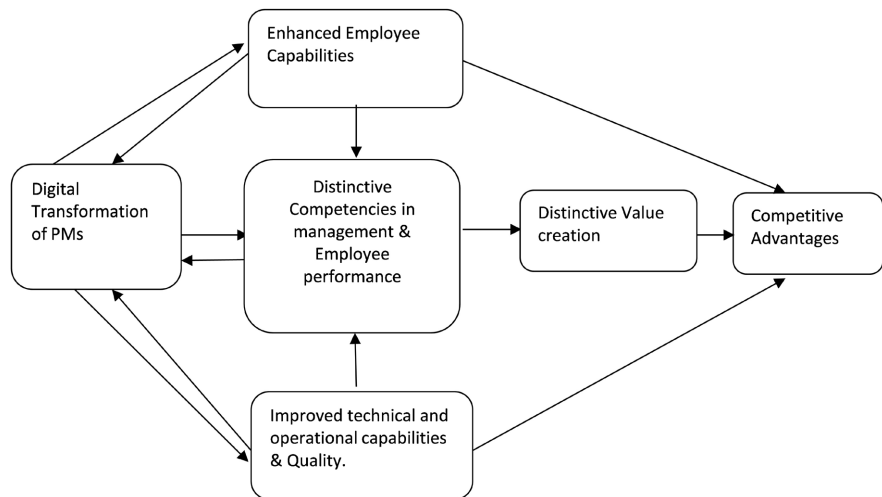


Figure 1. Shows the theoretical framework of the study developed by the authors.

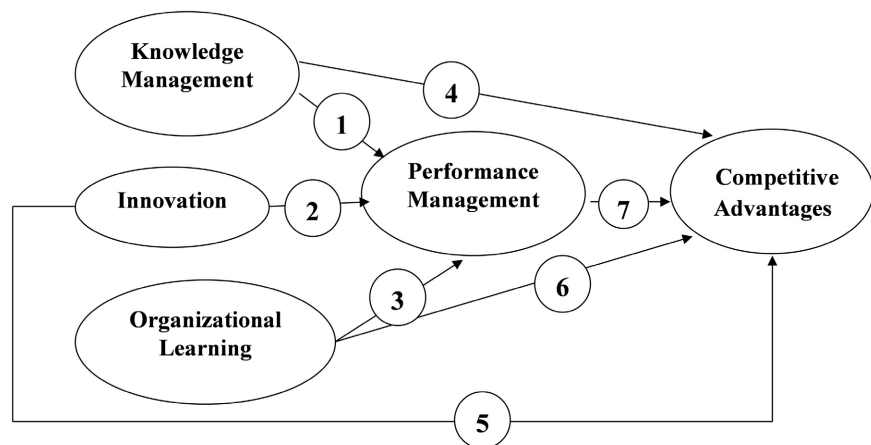


Figure 2. Shows the framework for constructing competitive advantages developed by Nuryanti, Samir, & Andreas (2018).

They have stated that a cooperative organizational environment can emphasize effective management of knowledge, skills and employee abilities, and enhance creativity. Which may cultivate improved employee performance, and this enhanced employee performance may translate into competitive advantages.

3. Research Methodology

This is exploratory research that will provide the groundwork for a conceptual framework by drawing on the research that has been previously done. The use of primary and secondary data in the study has been considerable. A questionnaire has been sent to each responder to gather all the main data. Conducting interviews has also been done to understand better the changing roles of digital performance management in competition and how these benefits are being used. Before conducting the main survey, a set of Key Informant Interviews (KIIs) were carried out with four employees from four prominent telecommunication companies in Bangladesh. The interviews played a crucial role in improving and completing the questionnaire for the following survey. The individuals chosen for these interviews were selected for their expertise and experience in the field of performance management systems (PMS) within the context of digital transformation in the telecommunication industry.

The KIIs explored various important aspects related to the research objectives, such as the implementation of Digital PMS, factors driving digital transformation in PMS, impacts of Digital PMS, and the correlation between Digital PMS and competitive advantages. By engaging in extensive conversations with these well-informed sources, we were able to acquire valuable perspectives on the complexities and subtleties of digital transformation in the field of performance management.

The questionnaire was designed with great care to cover all the themes that were identified in the KIIs. The study focused on exploring various aspects related to the use of digital tools and technologies in performance management. It examined the reasons behind the adoption of digital PMS, the effects of digitalization on employee performance and organizational outcomes, and the role of digital PMS in gaining a competitive edge in the telecommunication sector.

The study aims to capture a comprehensive understanding of the effects of digital transformation on employees' performance management systems in the telecommunication industry in Bangladesh by incorporating insights gathered from the KIIs into the questionnaire design. The questionnaire, once refined, becomes a powerful tool for collecting primary data. This data will then be analyzed to derive significant conclusions and gain valuable insights into the research objectives.

Using KIIs during the initial stage of the study helped to ensure that the questionnaire was relevant and valid. Additionally, it helped to build rapport and trust with important industry stakeholders. This approach highlights the dedica-

tion to thoroughness and inclusiveness in the research process, ultimately strengthening the trustworthiness and dependability of the study results.

3.1. The Population of the Study

The population of the study is all the Telecommunication Companies (hereafter TCCs) of Bangladesh. A sample survey was conducted in this study.

3.2. The Sample Selection and Sample Size Determination

The research employs a simple convenience sample approach and a judgment or purposive sampling strategy. Respondents were brought to locations where access to information and people interested in assisting with the research were available.

According to the Association of Bangladesh Telecommunication Operators (AMTOB), Bangladesh currently has four active mobile phone operators: Grameenphone Ltd. (GP), Robi Axiata Limited (Robi), Banglalink Digital Communications Ltd., and Teletalk Bangladesh Ltd. (Teletalk). The following **Table 1** summarizes the total number of permanent workers at these four companies:

To determine an appropriate sample size for this research, a formula for calculating sample size for a finite population can be used. One common formula for this purpose is the Cochran formula:

$$n = \{N \times Z^2 \times p \times (1-p)\} \div \{(N-1) \times e^2 + Z^2 \times p \times (1-p)\}$$

where:

n = sample size

N = population size (4800)

Z = Z -score corresponding to the desired confidence level (e.g., 1.96 for a 95% confidence level)

p = estimated proportion of the population with a particular characteristic (if unknown, typically assumed to be 0.5 for maximum variability)

e = margin of error (desired level of precision) (Cochran, 1977)

3.3. Calculation of Sample Size

$$n = \{4800 \times 1.96^2 \times 0.5 \times (1-0.5)\} \div \{(4800-1) \times 0.05^2 + 1.96^2 \times 0.5 \times (1-0.5)\}$$

$$n \approx 355.85$$

Table 1. Scenario of permanent employees worked in four companies.

| Operators | Total Employees | Proportion (%) |
|---------------------------------------|-----------------|----------------|
| Grameenphone Ltd. (GP) | 2200 | 45.83% |
| Robi Axiata Limited (Robi) | 1000 | 20.83% |
| Banglalink Digital Communications Ltd | 1100 | 22.92% |
| Teletalk Bangladesh Ltd. (Teletalk) | 500 | 10.42% |
| Total | =4800 | =100% |

*Information on the approximate number of total employees is collected from the HR Department of the respective Company.

So, the calculated sample size is approximately 356. Diverse specialists have divergent views on what constitutes an adequate sample size, as Hoe (2008) recommended a sample size of 200 for data analysis. Additionally, Jackson (2009) suggested that 200 to 400 responders would be enough for data analysis. As a result, the research sampled 200 respondents for data analysis.

Table 2 presents the distribution of the total number of respondents, with 86.5% of the targeted 200 samples were deemed suitable for analysis.

3.4. Research Instrument

A questionnaire was utilized to elicit answers from the study's participants. Respondents were asked to rate each statement on a five-point Likert scale as Strongly Agree or Strongly Disagree. These questions elicited responses ranging from 1 (strongly disagree) through 2 (disagree), 3 (neutral), 4 (agree), and 5 (strongly agree).

3.5. Data Collection Procedure

To collect information from the employees of four Bangladeshi telecommunications firms, an open conversation, observation of activities, and a survey were conducted. The research elicited interest from 200 responders at the four companies (**Table 3**). We conducted an e-mail survey with 200 employees. Numerous other surveys remained unanswered after being delivered to employees through e-mail.

Following secondary sources of data and information have been widely utilized to enhance the Study's significance and presentation.

1) Academic Journals: Search for articles in journals like MIT Sloan Management Review, MIS Quarterly, Journal of Management Information Systems, etc.

2) Government Publications: Review publications from the Bangladesh Telecommunication. Regulatory Commission (BTRC) or the Ministry of Posts, Telecommunications, and Information Technology for insights into industry standards and developments.

3) Company Annual Reports: Examine annual reports from major telecommunication companies in Bangladesh, such as Grameenphone, Robi, Banglalink, and Teletalk, which may include information on their performance management systems and digital strategies, etc.

4) Official websites of related companies: Explore the websites of Grameenphone Ltd., Banglalink Digital Communication Ltd., Talatalk Bangladesh Ltd., and Robi Axiata Bangladesh Ltd.

Table 2. The arrangement of the research Target.

| Positions/titles | Targeted sample | Respondent No | Appearance% |
|-----------------------------|-----------------|---------------|-------------|
| HR experts & administrators | 90 | 79 | 87.78 |
| IT personnel | 70 | 63 | 90 |
| Other executives. | 40 | 31 | 77.5 |
| Total | 200 | 173 | 86.5 |

Table 3. Data collection methods & tools.

| Sample Types | Data Collection Method | Tools used | No. of Respondents |
|---|--|---|----------------------|
| Key personnel | Open conversation before structuring the Questionnaire | Based on the literature and the conceptual framework | Total 8 from 4 firms |
| Four Bangladeshi telecommunications firms | E-mail survey | Questionnaire (Developed based on the interview with key personnel) | 200 |

3.6. Data Processing & Analysis

After completing the survey, the results were analyzed using quantitative methodology. The data were input into the IBM SPSS Statistics (25) software to begin the analysis. The raw results from the questionnaire may be analyzed using SPSS and MS Excel to get relevant information using frequency and descriptive statistics. The qualitative data collected was analyzed and summarized using Microsoft Word and the required tables. The study also includes an extensive interpretation and analysis section.

To summarize, the methodology used in this study combines qualitative insights from KIIs with quantitative data collection through a structured questionnaire. This approach offers a comprehensive view of the impact of digital transformation on the performance management systems of employees in the telecommunications industry in Bangladesh.

4. Data Analysis and Result

4.1. Survey Method and Parameters List for Questionnaire Design

Quantitative data were used in the study, which was gathered via a survey questionnaire sent to four well-known Bangladeshi telecommunications firms. Compared to others, these four businesses stand out as the most important. This study's low response rate is not a major concern since it was chosen using a random sampling process. Hence, the sample accurately reflects the characteristics of almost 90% of all TCCs that met the criteria.

The next step was to invite respondents to participate in the survey by sending them a letter detailing the study's purpose, its significance, and the researcher's contact information. The survey questionnaire and a link to it were sent to the respondents, all of whom held management roles, at the beginning of November 2022. The first reminder was sent after one week, and further reminders were issued weekly for the next three weeks. After receiving a total of four reminders, the survey was finally finished. Just 173 replies were received from the possible 200. A data screening process was carried out after the data was received, and invalid responses were omitted based on the following criteria: 1) Incompleteness, where more than half of the values in response were missing; 2) Validity, where responses contained the same answers for all survey items; 3) Inconsis-

tencies, where there were inconsistent responses from the same company. According to the predetermined standards, we had to exclude 3 replies, but we still got 170 (86.5%) legitimate ones.

4.2. The Demographic Profile of the Respondents

At the outset of our data collection, we categorize respondents according to their gender, level of employment, and years of work experience.

Table 4 illustrates the demographic distribution of our respondents, indicating a predominant male representation, with 68.82% of the 170 surveyed individuals being male, while 31.18% were female. Moreover, the data delineates the professional experience levels among participants, with 6.47% reporting less than one year of experience, 12.95% possessing one to four years of experience, 41.76% falling within the four to seven-year bracket, and 38.82% boasting more than seven years of experience. Further analysis reveals that the majority of workers surveyed are classified as mid-level (46.47%), followed by 19.42% at entry-level, and 34.11% occupying the highest echelons of management.

4.3. Analysis of the Application of Digital Transformation in PMSs

The respondents were asked if the firm uses the digital forms in employee performance management systems required to align with its vision and strategy. The following questions are set up as a yes/no test to see if an employee is familiar with the PMS material used by the company. Positive responses were given to all three of the first questions, which probed for a sense of the organization's overall course. Most responders (71%) agree that most, if not all, PMS functions can be automated using digital tools. According to the survey, 81% of people said they can gather an idea of an employee's performance from various digital data sources. Moreover, 72% are fine with data being shared digitally throughout many divisions. The following table clearly demonstrates that smart technologies used in performance management systems are well-received by workers. Many

Table 4. Demographic factors of the respondents.

| Demographic factors | No. of Respondents | Percentage (%) |
|---------------------|--------------------|----------------|
| Gender | | |
| a) Male | 117 | 68.82% |
| b) Female | 53 | 31.18% |
| Level of job | | |
| Top Level | 58 | 34.11% |
| Mid-Level | 79 | 46.47% |
| Entry Level | 33 | 19.42% |
| Experience | | |
| Less than a year | 11 | 6.47% |
| 1 year - 4 years | 22 | 12.95% |
| 4 years - 7 Years | 71 | 41.76% |
| More than 7 years | 66 | 38.82% |

respondents who provided a response indicated that they were open to gaining access to performance-related information digitally, as shown in the table below. Many respondents (86%+) believe that all gadgets have the capacity to both send and receive text messages. Employees are asked if the company uses digital forms in performance management systems to ensure they align with its long-term goals. The following questions are set up as a yes/no test to see if an employee is familiar with the PMS material used by the company. The answers to the first three questions, which dealt with the overall course the organization will take, were met with universal praise. According to the responses to the first question, 71 percent of PMS users agree that most or all their processes might be streamlined with digitalization. According to the survey, 81% of managers can gauge an employee’s performance using a variety of online metrics. Furthermore, 72% are fine with data being shared digitally throughout many divisions. The following table clearly demonstrates that smart technologies used in performance management systems are well-received by workers. Most respondents who responded indicated they were open to gaining access to performance-related information digitally, as shown in the table below. Many respondents (86%+) believe that all gadgets can both send and receive text messages (Figure 3).

4.4. Drivers of Digital Transformation in PMS

The drivers of digital transformation, such as smart technologies, digital business strategy, and digital-related capabilities, were evaluated based on multiple items, and respondents were asked to rate each item on a scale from [1] to [5], with [1] denoting a strong disagreement and [7] a strong agreement. The strategic approach included performance measurement systems with multiple items on a 5-point Likert-type scale ranging from [1] strongly disagree to [5] strongly agree, whereas the corporate sustainability strategy was evaluated using a single item on a 5-point Likert-type scale ranging from [1] poor to [5] excellent. The specific things are detailed in the appendix. Following Table 5 shows the descriptive analysis of the respondents.

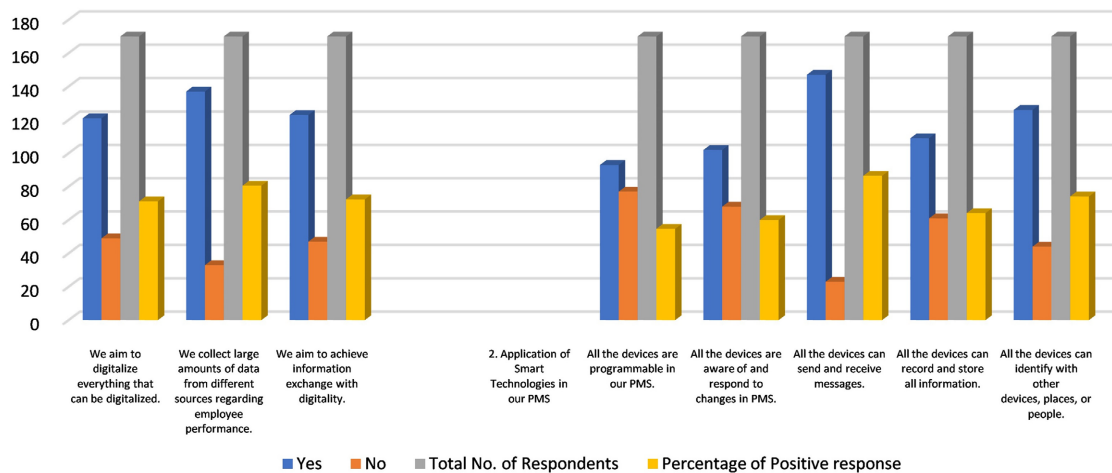


Figure 3. Application of digital transformation in PMSs.

Table 5. Descriptive analysis of the respondents.

| A. Digital Transformation of PMSs | N | Min | Max | Mean | St.d |
|---|----------|------------|------------|-------------|--------------|
| 1. We aspire to digitalize everything that can be digitalized within our organization. | 170 | 1 | 5 | 3.33 | 0.766 |
| 2. Digitality is a natural part of our business. | 170 | 1 | 5 | 3.19 | 0.871 |
| 3. Our business operations are transitioning to utilize digital technologies. | 170 | 1 | 5 | 4.06 | 0.813 |
| B. Drivers of Digital PMSs | | | | | |
| Digital capabilities that force toward Digitalization of PMS | | | | | |
| Managerial capabilities | | | | | |
| 4. Our company's management is familiar with digital tools. | 170 | 1 | 5 | 4.21 | 0.713 |
| 5. Our company's management has a clear vision for utilizing digitality in the future. | 170 | 1 | 5 | 4.37 | 0.671 |
| 6. Our company's management supports the utilization of digitality in our company. | 170 | 1 | 5 | 3.94 | 0.826 |
| Operational capabilities | | | | | |
| 7. Utilizing digitality has become an important part of our business. | 170 | 1 | 5 | 3.87 | 1.106 |
| 8. Digitality enhances our streamlined operation, internal efficiency, and process management. | 170 | 1 | 5 | 4.25 | 0.763 |
| Employee-related capabilities that force toward Digitalization of PMS | | | | | |
| Employee capabilities | | | | | |
| 9. Digital skills development is supported and promoted in our company. | 170 | 1 | 5 | 4.49 | 0.961 |
| 10. Our employees are well trained in digital tools usage. | 170 | 1 | 5 | 4.18 | 0.921 |
| 11. Our employees easily accept the digitalization of the operating environment. | 170 | 1 | 5 | 4.56 | 0.745 |
| Innovation capabilities | | | | | |
| 12. Digitality enables innovations and new ideas in our company. | 170 | 1 | 5 | 4.14 | 0.786 |
| 13. Digitality forces us to develop new solutions with constructive feedback. | 170 | 1 | 5 | 3.76 | 0.956 |
| 14. Digitality helps to produce improved competency. | 170 | 1 | 5 | 3.91 | 0.911 |
| C. Values offered by Digital PMS | | | | | |
| 15. The Digital PMS ensures clear communication of expectations and standards, which can positively affect the employee's performance. | 170 | 1 | 5 | 3.23 | 1.235 |
| 16. A Digital Performance management system (DPMS) gives the option to communicate with supervisors and the independence to select how to perform the work. | 170 | 1 | 5 | 3.91 | 1.112 |
| 17. The Digital PMS lets workers have a hand in deciding how they will be evaluated by management. | 170 | 1 | 5 | 3.87 | 0.873 |
| 18. The Digital PMS guarantees that the evaluations of the needs and challenges of work accurately reflect reality. | 170 | 1 | 5 | 3.62 | 0.915 |
| 19. The Digital PMS enables the impartiality of the evaluators. | 170 | 1 | 5 | 3.47 | 0.843 |
| 20. The Digital PMS allows employees to dispute unfair or erroneous appraisals, which may influence morale. | 170 | 1 | 5 | 4.65 | 0.781 |
| 21. Digital PMS is incapable of considering personal ties. | 170 | 1 | 5 | 4.38 | 0.753 |
| 22. Digital performance management systems affect the emotional intelligence of employees. | 170 | 1 | 5 | 4.51 | 0.869 |
| 23. The Digital PMS enhances the rater's objectivity and precision. | 170 | 1 | 5 | 4.21 | 0.917 |
| 24. The Digital PMS facilitates rapid evaluation and feedback. | 170 | 1 | 5 | 3.62 | 0.819 |

Continued

| Distinctive value offered by Digital PMS that leads to Competitive Advantages: | | | | | |
|--|--|-----|---|---|------------|
| 25. | Digital PMSs cut expenses by revealing performance issues immediately and decreasing wasteful practices. | 170 | 1 | 5 | 3.78 0.719 |
| 26. | Digital PMS eliminates documentation and saves time. | 170 | 1 | 5 | 3.39 0.937 |
| 27. | The Digital PMS enables more accurate calculation of performance indexing | 170 | 1 | 5 | 4.58 0.951 |
| 28. | The Digital PMS blends performance evaluation with skill development to boost employee innovation. | 170 | 1 | 5 | 4.21 0.719 |
| 29. | DPMSs increase productivity Rate by providing on-time feedback. | 170 | 1 | 5 | 4.59 0.823 |
| 30. | Digital PMSs reduce personnel turnover and recruiting trouble. | 170 | 1 | 5 | 3.78 0.943 |
| 31. | Digital PMSs make companies more competitive both internally and externally. | 170 | 1 | 5 | 3.33 0.817 |
| 32. | Modern cloud-based PMSs attract a wider variety of skilled people. | 170 | 1 | 5 | 3.19 0.735 |

Nunnally and Bernstein say that the CR value must be better than 0.70 for construct reliability. In this research, each value was higher than 0.70 (see **Table 6**). Hair et al. (1998) suggested that the construct validity was checked by looking at both convergent and discriminant validity. The numbers of Average Variance Extracted (AVE), which should be more than 0.50 (Bagozzi & Yi, 1988), were used to determine convergent validity. The results of the CFA showed that all AVE scores were higher than the 0.50 cut-off point.

As part of a reliability analysis, it is necessary to examine the test's output score to determine whether the instruments' items are, in fact, reliable. For better internal consistency, the output score should be greater than 0.7. Alpha = 0.875, as demonstrated in **Table 7**, clearly illustrates the reliability of the instrument.

4.5. Summary of Findings

The study used convenience and judgement/purposive sampling. Responses were collected in convenient settings with simple access to information and eager research participants. The Association of Bangladesh Telecommunication Operators (AMTOB) lists four major mobile phone operators in Bangladesh: Grameenphone Ltd. (GP), Robi Axiata Limited (Robi), Banglalink Digital Communications Ltd., and Teletalk Bangladesh Ltd. **Table 1** summarises the quartet of enterprises' full-time staff counts.

According to **Table 2**, the distribution of the total number of respondents is presented. Out of the targeted sample size of 200, a total of 86.5% were deemed suitable for inclusion in the analysis.

Notably, the questionnaire design was informed by discussions with key personnel, as delineated in **Table 3**. Building upon a conceptual framework (depicted in **Figure 1**, drawing inspiration from **Figure 2**), interviews were conducted with these key stakeholders to delve into the evolving landscape of digital performance management and its implications on competitive dynamics.

Table 6. Reliability and validity of statistics.

| | CR | AVE | MSV | 1 | 2 | 3 | 4 |
|----------------------------------|-------|-------|-------|--------------|--------------|--------------|--------------|
| 1-Digital Transformation of PMSs | 0.874 | 0.797 | 0.376 | 0.893 | | | |
| 2-Drivers of Digital PMSs | 0.912 | 0.833 | 0.329 | 0.308 | 0.913 | | |
| 3-Values of Digital PMSs | 0.798 | 0.875 | 0.479 | 0.322 | 0.568 | 0.935 | |
| 4-Competitive Advantages | 0.956 | 0.823 | 0.513 | 0.431 | 0.371 | 0.444 | 0.907 |

N = 170; diagonal values in bold are the square root of AVE; $p < 0.001$.

Table 7. Reliability analysis.

| Cronbach's Alpha | Standardized Items' Cronbach's Alpha | No. of Items |
|------------------|--------------------------------------|--------------|
| 0.874 | 0.875 | 32 |

Table 4 shows that 68.82% of the 170 respondents were male and 31.18% female. The data also shows that 6.47% of participants had less than one year of professional experience, 12.95% had one to four years, 41.76% had four to seven years, and 38.82% had more than seven years. Further data shows that 46.47% of workers are mid-level, 19.42% are entry-level, and 34.11% are top-level.

The exploratory investigation encompassed both primary and secondary data sources. A total of 200 employees from Bangladeshi telecommunication companies participated in the completion of a questionnaire (refer to **Table 5**). The survey shows that digital transformation improves performance management systems for sustainability and workforce performance. Most respondents said digital tools could automate PMS functions. Digitalization improved operations, efficiency, and process management. Employees also supported digital performance data access.

The study found that management and operational capabilities, digital skills development, and innovative capabilities drove PMS's digital transformation. Digital PMS promote communication, allow employees to participate in evaluations, improve objectivity and precision, and give timely evaluation and feedback, according to respondents (see **Table 5**).

Digital PMS reduced expenses by quickly identifying performance issues and removing inefficient behaviours. They also boosted productivity, innovation, retention, and talent. Cloud-based PMSs attracted more talent.

Questions included if the organisation uses digital forms in employee performance management systems to support its vision and strategy. A yes/no test determines if an employee knows PMS material. All three first organisation direction questions were answered affirmatively (See **Figure 3**). The majority (71%) believe digital technologies can automate most PMS functions. The survey indicated that 81% of respondents can evaluate staff performance digitally. Also, 72% are fine with divisions sharing info digitally. The table below demonstrates workers favour smart performance management system technology. The table

below shows that many respondents were open to digital performance information. Most respondents (86%+) believe all devices can text. To link performance management systems to long-term goals, employees are asked if the company uses digital forms. A yes/no test determines if an employee knows PMS material. All praised the first three questions, which addressed the organization's direction. In response to the first question, 71% of PMS users think digitization might streamline their processes. The survey says 81% of managers can measure staff performance using online analytics. Also, 72% are fine with divisions sharing info digitally. The table below demonstrates workers favour smart performance management system technology. The table below shows that most respondents were open to digital performance information. Most respondents (86%+) believe all devices can text.

The research instrument's Cronbach's alpha coefficient of 0.875 shows strong internal consistency and reliability in **Table 6** and **Table 7**.

Nunnally and Bernstein recommend CR values over 0.70 for construct reliability. In this study, all values above 0.70 (**Table 6**). Hair et al. (1998) advised checking construct validity with convergent and discriminant validity. Convergent validity was determined by AVE, which should be greater than 0.50 (Bagozzi & Yi, 1988). The CFA showed that all AVE scores exceeded 0.50.

The research reveals that digital performance management solutions can give Bangladesh's telecommunications industry durable competitive advantages. Digital tools, capabilities, and strategies improve performance management and organizational competitiveness.

4.6. Overall Discussion on Results

The study shows that digitization has a major influence on performance management systems (PMS) in Bangladesh's telecoms sector. The study shows the benefits of digital performance management systems using primary survey data and interviews.

First, the report emphasizes how digital technologies improve performance management efficiency, effectiveness, and sustainability. Digitalization streamlines processes and lets companies swiftly adapt to changing market conditions by automating PMS activities like data collecting, analysis, and feedback.

Additionally, the study highlights the substantial correlation between digital project management adoption and organizational competitiveness. Telecom firms may improve internal operations and acquire a competitive edge with digital capabilities and plans. Cloud-based PMS attracts and retains top people, which boosts diversity and creativity.

The research also identifies management and operational competencies, digital skills development, and innovative capability as key drivers of PMS digital transformation. These findings emphasize organizational leadership and human capital development as key to navigating digitalization's complexity.

Digital project management reduces costs, and boosts productivity, creativity,

staff retention, and skill recruiting, according to the study. Digital PM systems' value proposition is enhanced by their ability to encourage open communication, employee evaluation participation, and fast feedback.

Recognized management and operational competencies, digital skills development, and innovative capability as PMS digital transformation drivers. To manage digitization, corporate leadership and human capital development are crucial.

The data also shows that digital PMs deployment improves cost savings, productivity, creativity, staff retention, and talent acquisition. Digital PM systems are more valuable since they stimulate employee engagement in assessments, promote transparency, and provide rapid feedback.

5. Conclusion

This study examined the effect of digital transformation on performance management systems in the Bangladeshi telecommunications sector. The primary and secondary data analysis revealed that digitalization enhances performance management systems, employee performance, and sustainability. Respondents acknowledged the capability of digital tools to automate various performance management system functions. Digitalization has improved operations, productivity, and process management. Employees supported digital access to performance-related information. The study identified digital transformation drivers, such as managerial and operational capabilities, the development of digital skills, and innovation capabilities. It was discovered that digital performance management improves communication, employee evaluation participation, objectivity, precision, and timely feedback. In addition, digital performance management systems were linked to decreased costs, increased productivity, innovation, employee retention, and talent attraction. Cloud-based systems were especially effective at enticing a diverse workforce. The research instrument was internally consistent and reliable to a high degree. Implementing digital performance management solutions has the potential to provide Bangladesh's telecommunications industry with long-term competitive advantages.

Recommendations

Several suggestions can be made for Bangladeshi telecom companies that wish to maximize digital performance management, based on our analysis of the study's findings:

Emphasize Digital Skills Development: Organizations must prioritize programs that enable workers to confidently traverse the digital world. Training personnel in data analytics, digital communication, and technical competency can help them use digital performance management solutions.

Take Advantage of Cloud Solutions: Telecom firms could embrace cloud-based PMS due to its proven talent attraction and retention benefits. Cloud computing lets teams in multiple places collaborate and organize data by scaling resources, adapting to changing demands, and accessing data from anywhere.

Encourage Open Communication and Performance Feedback Loops: Open communication and performance feedback loops may enhance employee engagement and motivation. Management and staff may better track goals, monitor performance in real-time, and provide constructive comments using digital PM systems.

Accept Innovation in Performance Management: Innovation drives digital transformation; thus firms should include innovation measures in their performance management frameworks. Encourage experimentation, risk-taking, and information exchange to develop a culture of innovation that fosters continual improvement and keeping ahead of the competition.

Assessing and Analyzing Impact: To strengthen digital project management, projects must be regularly assessed and analyzed. KPIs for employee productivity, happiness, and business outcomes must be tracked regularly. This will inform strategic decisions.

In an ever-changing digital and competitive market, telecom firms in Bangladesh may build a solid foundation for success by adopting digital performance management solutions and integrating them with corporate goals and priorities.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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