

# THE IMPACT OF AI-DRIVEN HR TECHNOLOGIES ON PERFORMANCE MANAGEMENT AND EMPLOYEE DEVELOPMENT: A STUDY OF THE TELECOMMUNICATION SECTOR IN BANGLADESH

S.K Md Anik Hassan Rabby<sup>1\*</sup>, Abdullah Al Jubair<sup>2</sup>, Tasnim Zerin Nizhum<sup>2</sup>, Muhammad Asiful Haque<sup>2</sup>

<sup>1</sup>Department of Management Studies, Bangladesh University of Professionals, Dhaka, Bangladesh.

<sup>2</sup>Faulty of Business Studies, Bangladesh University of Professionals, Dhaka, Bangladesh.

Corresponding Author: S.K Md Anik Hassan Rabby, Email: [anikhassanrabby@gmail.com](mailto:anikhassanrabby@gmail.com)

**Abstract:** This study investigates the impact of AI-enabled HR technologies on employee development and performance management within Bangladesh's telecommunication sector. Using PLS-SEM analysis of survey data collected from 205 employees through Google Forms across telecommunication companies in Bangladesh, the research examines three key technological capabilities: AI-powered Performance Analytics (APA), Intelligent Learning Management Systems (ILM), and Predictive HR Analytics (PHA). The findings reveal that Predictive HR Analytics demonstrates the strongest influence on both employee development and performance management, while AI-powered Performance Analytics shows significant impact only on performance management. Intelligent Learning Management Systems positively influence employee development but show no significant effect on performance management. The model explains 81.7% of variance in employee development and 70.7% in performance management, suggesting robust explanatory power. These findings suggest that predictive analytics constitute a cornerstone for leveraging AI in HR, offering a strategic advantage by aligning technology with organizational objectives. The study contributes to the ongoing discourse on HR digitalization by highlighting the differential impacts of AI-enabled tools and underscores the need for improved integration between diverse HR systems to fully realize the benefits of technological innovation in human capital management.

**Keywords:** AI-enabled HR technologies; Predictive HR analytics; Employee development; Performance management; Telecommunication industry

## 1 INTRODUCTION

### 1.1 Background of the Study

In today's rapidly evolving business landscape, human resource management (HRM) is undergoing a major transformation through the adoption of advanced technological tools. In particular, artificial intelligence (AI) is reshaping traditional HR practices by enhancing decision-making accuracy, streamlining operations, and generating valuable data-driven insights [1]. With its ability to process large volumes of data and offer predictive insights, AI is now being recognized as a pivotal force in modern HR processes such as performance management and employee development [2].

The telecommunication sector in Bangladesh, characterized by major players like Grameenphone, Robi Axiata, Airtel, and Banglalink, has been at the forefront of technological innovation [3]. These companies not only drive the country's rapid digital transformation but also confront significant HR challenges due to their extensive and diverse workforces. In such a competitive environment, integrating AI-driven HR technologies can play a critical role in refining performance evaluation methods and identifying tailored employee development opportunities [4]. However, despite the promising potential of these technologies, their adoption remains uneven and under-explored within the Bangladeshi telecommunication context.

While AI-based tools have been successfully implemented in various industries worldwide, evidence regarding their strategic impact on HR practices in Bangladesh—especially in performance management and employee development—is limited [5]. Most organizations in the telecom sector have yet to fully exploit these technological advances to nurture human capital. Furthermore, the unique cultural and economic characteristics of Bangladesh may pose specific challenges and opportunities that have not been adequately addressed in existing research. This study seeks to fill this gap by systematically evaluating the impact of AI-driven HR technologies on two critical dimensions: performance management and employee development.

### 1.2 Research Objective

The main objective of this research is to evaluate the impact of AI-driven HR technologies on performance management and employee development within the telecommunication sector of Bangladesh. To achieve this, the study aims to:

- Identify and analyze the AI-driven HR technologies currently employed by major telecom companies in Bangladesh, including Grameenphone, Robi Axiata, Airtel, and Banglalink.

- Assess the effectiveness of these technologies in enhancing performance management processes and fostering employee development.
- Examine the challenges and opportunities associated with the implementation of AI-driven HR solutions in the Bangladeshi telecom sector.
- Evaluate the perceptions of employees and HR professionals regarding the impact of AI-driven technologies on their work experiences and career development.

## 2 LITERATURE REVIEW

### 2.1 HR Technologies Evolution

There is a sea change in the practices of human resource management through technology and this change is reshaping the path of organizational development in the case of Bangladesh telecommunication sector. This evolution is a major departure from the paper-based systems, and is gradually making its way to the (now) sophisticated digital solutions, which entirely changes the way organizations manage their human capital [6]. The telecommunication industry, as the leader in adopting technology in Bangladesh, has been transformed the most and second to none in Bangladesh's fast prospering economy. Because of its unique status as a technology leader, the sector has been a prime example for testing innovative HR solutions far beyond basic administrative functions.

#### 2.1.1 Traditional HR systems to digital transformation

Phases of the journey from conventional HR practices to digital solutions have been seen in the telecommunication sector of Bangladesh. Companies started with digitizing basic employee records and attendance systems, but then gradually progress to more advanced digital solutions. In leading telecommunication companies such as Grameenphone, Robi, and Banglalink, the requirement for effective management of large, distributed workforces has led to rapid adoption of technology [7]. The digital transformation has enabled the simplification of HR processes, reducing the time it takes to find suitable candidates for the right roles, when they join, and how they can develop further and thrive as an individual and within a business.

This digital transformation in the telecommunication sector of Bangladesh has been witnessed by a series of important developments. Integrated HR management systems such as are brought in place which integrate many employee management processes. Grameenphone's implementation of a comprehensive digital HR platform offers an example, which has brought about approximately 60% reduction in processing time for HR related tasks, while Robi's digital transformation initiatives have resulted in 40% improvement in HR operational efficiency. On the surface, these improvements have been most crucial in managing the huge number of workers present in any significant organization, which number into thousands [8].

#### 2.1.2 Emergence of AI in HR practices

Artificial Intelligence taking a front seat within HR practice is the latest revolution in this technology pilgrimage. AI combined with new data science capabilities has ushered in unprecedented abilities for data analysis, decision making, and process automation [9] within Bangladesh telecommunication sector. Thanks to this technology, HR departments are able to move away from reactive problem solving and onto proactive strategic planning. Areas such as talent acquisition, performance evaluation and employee development have enjoyed the benefits of the emergence of AI, particularly in that data driven insights can improve decision making accuracy and efficiency [10].

Several factors have led to the adoption of AI in HR practices of Bangladesh's telecommunication sector like to gain better efficiency, better decision making capability and employee experience. AI powered chatbots are used by companies for employee queries, automated screening systems for recruitment and intelligent analytics for performance management. With this, companies have shared encouraging results on improved employee satisfaction metrics and lower time-to-hire metrics.

### 2.2 AI powered Performance Analytics

The use of AI powered performance analytics to facilitate the evaluation and management of employee performance in telecommunication companies in Bangladesh is already a hit. The emergence of this technology has brought with it more modern and data oriented approaches to performance measurement and management, allowing organizations to make better informed decisions about their workforce [11]. In an industry where performance metrics are the only things that serve as an indicator of the quality and volume of service and customer satisfaction [12], the impact has been too huge.

#### 2.2.1 Real-time performance monitoring

AI has revolutionized how telecommunication companies monitor and monitor employee productivity in real time. They characterize such systems, that continuously collect and analyze data from various sources (e.g., customer interactions, project management tools and communication platforms) [13]. Real time monitoring has also led to the quick identification of performance issues and quick intervention in cases where quick intervention is required in Bangladesh's telecom sector where good customer service and technical operations are of utmost importance. For our large customer service teams and technical operations spread internationally, this capability has proven particularly valuable.

Real time monitoring systems are implemented to witness huge benefits of telecommunication companies. For example, after implementing AI powered performance monitoring one major telecom provider in Bangladesh claimed 30% improvement in customer service response times [10]. These same systems have also allowed more effective identification of training needs and directed them accordingly to more focused skill development programs. Given their real-time nature, the systems proved particularly valuable for managing remote work situations that have become more prominent in recent global challenges.

### **2.2.2 Predictive performance modeling**

Predictive modeling capabilities have been introduced by AI powered systems which enable the organizations to predict its performance trends and pitfalls [13]. These predictive models are applied in Bangladesh telecommunication sector and analyze the historical performance data, find the patterns and how these forecast the future performance. HR managers can now use this capability to institute preventive measures before performance issues occur, resulting in better workforce management and better organizational results.

But in several areas it is remarkable the application of performance predictive modeling. Companies have seen an improved ability to identify high potential high potential employees, predict performance challenges, and implement timely intervention. For example, one major telecom operator in Bangladesh lowered employee attrition by 25% by employing predictive modeling to identify early engagement problems and intervening to remedy them.

## **2.3 Intelligent Learning Management Systems**

Intelligent learning management systems have been a new advancement to employee development in the telecommunication sector of Bangladesh. However, these systems have enabled a better transformation of traditional training methods into personalized and adaptive learning experiences tailored to meet individual and organisational needs. In an industry with such fast technological advancement, technological skills need to be updated regularly, making the implementation of these systems more important than ever [14].

### **2.3.1 The personalized learning paths**

These days, intelligent learning management systems (LMS) have become employee development guru by creating personalized learning pathways, tailored to individual needs, according to organizational requirements. These systems use employee performance data, skill gap and career aspiration information in Bangladesh's telecommunication sector, where technical skills and capabilities pertaining to customer service are of critical importance, to design decentred targeted learning programs. By personalizing this, you're able to create more effective skill development and alignment with employee growth and organizational objectives.

Results indicate impact of personalized learning paths on employee development outcomes. Study reports that companies have experienced increased completion rates for training programs, improved knowledge retention rates, and happier employees related to learning opportunities [15].

### **2.3.2 Adaptive learning technologies**

Adaptive learning technologies have been implemented to improve the effectiveness of employee training programs in telecommunication. These systems change the learning content and pace accordingly to an individual's progress and their learning patterns in order to maximize the amount of knowledge retained and the amount of skills developed. Adaptive learning technologies have shown particularly high value for Bangladesh's telecom companies which depend on retaining a skilled workforce to be competitive, including in technical training and customer service skill development [4].

Among the learning technologies, the impact has been most prominent in technical skill development. To date, companies have experienced a great deal of success in training effectiveness. Employees are able to reach competency using new technologies 40% faster when trained this way versus through a traditional model [16]. The results clearly show that percent of these systems are also a cost effective method of improving outcomes while lowering the training related cost.

## **2.4 Predictive HR Analytics**

In Bangladesh's telecommunication sector, the use of predictive HR analytics to house strategic workforce planning and management has been growing [7]. Through this technology, organizations can make data informed decision about their human resources and use this to better manage their talent and have better results in the organization. Predictive analytics has revolutionized how companies manage HR—everything from recruitment to retention.

### **2.4.1 Talent acquisition and retention strategies**

Predictive analytics in the area of talent management has been playing an important role in how telecommunication companies in Bangladesh gear up recruitment and retention. These systems study historical information, market patterns, and employee design practices to alter future abilities and possible maintenance issues [17]. The highly competitive telecom sector has a great demand for skilled professionals which has made this predictive capability indispensable for keeping a stable and capable force.

Predictive analytics have been leveraged by companies to massively improve their hiring process. After introducing predictive analytics in their recruitment system of one major telecom operator, there was 35% decrease in time to hire and 25% improvement in retention rate for new hire. Such systems have likewise enabled firms to detect potential future retention risks, and take advantage of proactive measures to keep key talent.

### **2.4.2 Workforce planning and optimization**

Workforce planning in the telecommunication sector of Bangladesh has been revolutionized by the use of predictive analytics. These analyze the patterns of workforce demographics, skill distribution, market demand and report it to predict and forecast the future requirement of staffing [18]. In a dynamic telecom industry, with new technology and market shifts occurring at break neck speed, workforce planning needs to be nimble.

Predictive workforce planning has helped companies to optimize the resource allocation, as well as to save the cost of over or under staffing [19]. Better awareness of how to align workforce capabilities with business needs and improved ability to plan for future skill requirements have been reported by organizations.

## **2.5 Ways Artificial Intelligence is Affecting Employee Experience**

In Bangladesh's telecommunication sector, the integration of AI driven HR technologies has played a key role in employee Experience changing the way employees work with HR and how they perceive workplace environment. The transformation has increased employee experiences for improved job satisfaction and organizational commitment.

### **2.5.1 AI-driven employee engagement initiatives**

Employee engagement of the telecommunication sector has been revolutionized by AI technologies. These systems analyze patterns of employee interactions, feedback, and performance data to learn more about what's going well and where the potential issues are already in the works. AI driven engagement initiatives in Bangladesh's telecom companies allow employees to experience more personalized experiences which increase job satisfaction and organizational commitment [20].

After the implementation of AI driven initiatives, companies have seen significant improvements in employee engagement metrics. For example, one major telecom provider experienced a 30% lift across employee engagement scores by launching an AI powered engagement platform [21]. They also allowed organizations to better identify and redress engagement problems which has positively affected retention and workplace satisfaction.

### **2.5.2 Communication and feedback systems as support for managerial decision making**

Organizations interact with their employees through AI powered communication and feedback systems. These systems allow for greater communication and real interaction between management and employees in Bangladesh's telecommunications sector. The organizations can understand what employees are concerned about and what their preferences are through automated feedback collection and analysis, thereby becoming better at communication and workplace relationships [22].

Enhanced communication systems, that have been implemented, have shown measurable improvements in the workplace communication effectiveness. There is more employee participation in feedback processes and better resolution rates on employee matters for companies. They have helped organizations form better cultures and better align employee and organizational goals.

## **2.6 Fairness and Transparency in HR Systems Driven by AI**

However, fair and transparent use of AI-driven HR systems have become organizational and organizational concern in telecommunication of Bangladesh. With an ever larger percentage of companies making crucial HR decisions based on AI, it is essential that all employees receive fair treatment and proper communication [23]. This provides this aspect with high significance in the cultural context of Bangladesh as there is the need of an agreement between tradition and the recent technology advancement. As pioneer adopters of AI in the telecommunications sector, the sector is burdened with the task of setting the 'fair and just' bench marks for AI driven HR practices.

A major focus of the challenge for telecommunication companies in Bangladesh regarding the pursuit of algorithmic fairness in HR decisions. Across recruitment, performance evaluation, etc., organizations must ensure that all the AI systems discharge unbiased decisions [24]. In Bangladesh's diverse workforce environment this challenge is exceptionally relevant and mostly affected by the educational background, regional origin, and language proficiency.

Some of the leading telecommunication companies in Bangladesh have implemented measures to be fairly specific around their algorithms. One example for such changes is that a large operator will introduce a regular audit to their AI-powered recruitment software, where the selection criteria are not subjected to unconscious bias [25]. A dual-validation system implemented by another company includes putting AI recommendations in play for promotions and performance evaluations under human HR professional review for fairness and contextual appropriateness.

## **2.7. Digital Literacy and Technology Adoption**

For the success of AI driven HR technologies in Bangladesh's telecommunication sector, it mainly depends on employees' digital literacy levels and their attitude towards using new technologies. This factor is especially important in a developing economy where, depending on the skill level for digital platforms among workforce, digital transformation could take many forms. Despite being technologically advanced, the telecommunication sector and sector HR must deal with this particular variation in order to successful implement such AI driven human resource systems.

### **2.7.1 Digital literacy for assessment and enhancement**

Some telecommunication companies in Bangladesh did realize the need for systematic assessment and enhancement in digital literacy level amongst its employees. In order to allow each and every employee to be capable of communicating with AI-driven HR systems, organisations have carried out extensive digital literacy programs [9]. Everything starts from basic digital skills training and goes as far as training in AI interaction and data interpretation.

But there are also several success stories that have come out of these efforts. For example, one of the major telecom providers they are working with reported 85% increase in employee interaction with AI driven HR systems after implementing a structured digital literacy program.

### **2.7.2 Strategies for technology adoption**

AI-driven HR techs adoption is not a simple exercise that does not require a well-planned strategy that takes both human and technical variables into consideration. All this has led companies in the telecommunication sector in Bangladesh to adopt comprehensive approaches for boosting technology adoption and overcoming resistance to that adoption. However, most of these strategies entail phased implementation plan, peer support system, and continuous feedback mechanisms [22].

Different adoption strategies have been used by companies with reported significant success. An example of this is an organization who, through a peer champion program, saw an 75% voluntary adoption rate of their new AI driven

performance management system. A gamification approach was implemented in another company for an AI driven learning management system, which led to a 90% engagement within the first six months of operations [19].

## **2.8 Cultural Implications of AI to Be Adopted in The HR Sphere.**

The implementation of AI driven HR technologies in Bangladesh Telecommunication step firmly through the mine filled cultural norm and expectation landscape. Achieving this integration represents a very delicate balance between technological advancement and sensitivity to culture, as it is a society in which personal relations and hierarchical structures are important in professional context.

### **2.8.1 Cultural adaptation of AI**

Systems provides methods to incorporate AI systems into efficiently functioning decision systems and predict the effects of their adaptations into these systems before deployment.

In order for AI based HR systems to be properly implemented in Bangladesh telecommunication sector, it would be properly implanted after a better understanding of the local cultural context. Many companies have come to understand that they must adapt global AI solutions to a local context, into something that fits with local values and practices. In the adaptation of this, language preferences communication styles and cultural norms must be taken in as they affect decision making processes [26].

Some telecommunication companies have shown successful cultural adaptation of its AI systems. One of the four main users modified their AI powered feedback system to address the traditional Bengali communication styles and succeeded in growing employee engagement rate with the system by 45%. One other company altered their AI driven performance criterion to include cultural related metrics, and saw better acceptance and knowledge caught by the employees.

### **2.8.2 Managing cultural transition**

For many organizations in Bangladesh's telecommunication sector, the change to employ AI driven HR systems is a major one in terms of cultural shift. We must help companies through this transition whilst maintaining the value of traditional work culture. HR practices need to secure the balance between technological efficiency and human touch in this process.

A range of approaches for managing this cultural transition have been implemented by organizations. For instance, a company added hybrid system in which face to face conversations supported with the traditional way of AI recommendations retain the personal touch valued by Bengalis [20]. A cultural integration framework was developed by another organization designed to enable the alignment of AI driven processes with local customs and practices.

### **2.8.3 Organizational relationship**

In Bangladesh, implementation of AI driven HR systems has changed organizational relationship in telecommunication companies. New dynamics in superior subordinates, peer interactions and teams' collaboration have been introduced by these systems. So crucial are these changes that increasingly, understanding and managing them are essential for positive work relationships to be maintained.

Various organizational relationships have been impacted after AI implementation by companies. Objective AI driven performance metrics have led to some organizations that have seen an improvement in transparency in superior sub below relationships. Secondly, others [17] have mentioned the emergence of changes in team dynamics upon the incorporation of new methods of performance evaluation and as AI systems come in to enable a new way of collaborating. So, the key to success has played in a balance between technological efficiency and tradition relationship based management styles.

## **3 THE TELECOMMUNICATION INDUSTRY OF BANGLADESH**

### **3.1 The Growth of the Telecommunication Industry in Bangladesh**

The sector that has plays vital role in this rapid transformation is telecommunication industry of Bangladesh, which indeed have experienced dramatic change after the independence of the Bangladesh in 1971 [27]. From the circumstance of the initial and primary BTTB where services offered were only limited to the fundamental and straightforward fixed line telephone services, the sector has grown and matured into a colorful telecommunication marketplace that is succinctly important for the nation's social and economic growth as well as the overall process of going digital.

#### **3.1.1 Historical development**

The evolution of telecommunication sector of Bangladesh has gone through couple of unique phases. During post-independence up to first decade, telecommunications services were in a form of fixed wire line services that were under government's control, with very low market penetration and availability mainly to urban markets only. Bangladesh leads the South Asian nations where cellular services have their root from 1989 apart from introducing these first by the Bangladesh Rural Telephone Authority.

This new era of telecommunication business was started in 1996, when the government of the Peoples Republic of Bangladesh awarded the first private cellular license to Grameenphone during the tenure of Begum Khaleda Zia. Subsequently more operators such as Robi (previously Aktel), Banglalink (previously Sheba) and Citycell joined the already competitive telecom market which is today considered as a major driver of industry growth

Facilitating an improvement in the growth of technologyon Industry in Bangladesh The telecommunications industry in Bangladesh has undergone a remarkable transformation since the country's independence in 1971 [27] From a modest beginning with basic landline services provided by the Bangladesh Telegraph and Telephone Board (BTTB), the sector

has evolved into a dynamic and competitive market that plays a crucial role in the country's economic development and digital transformation [34].

### **3.1.2 Historical development**

The journey of Bangladesh's telecommunication sector can be traced through several distinct phases. In the initial years following independence, telecommunications services were limited to government-operated landline systems, with minimal penetration and restricted access primarily to urban areas. The transformation began in 1989 when Bangladesh became the first South Asian country to introduce cellular services through the Bangladesh Rural Telephone Authority (and Jahan, 2020). A significant milestone was reached in 1996 when the government issued the first private cellular license to Grameenphone, marking the beginning of the modern telecommunications era in Bangladesh. This was followed by the entry of other operators like Robi, Banglalink (formerly Sheba), and Citycell, creating a competitive market environment that would drive rapid industry growth.

## **3.2 Market Current Model and Competition**

The dynamics of competition in the given telecommunications context introduced in Bangladesh over the course of the last two decades look quite intricate. These factors include the strategic merge and acquisition as well as technological changes that have favoured today's complex market structure. The change has been from a state monopoly to a competitive industry with many players continuously competing for customers through offering new exciting services and competitive prices.

### **3.2.1 Major market players**

Currently, the Bangladesh telecommunications market is made up of four key players who have different strengths which they have transposed to their business model. Competition has increase but through the provision of new and different services as well as unique strategic positioning the various operators have distinguished themselves in the market. Grameenphone whereby the firm has been performing exceptionally well in the country on account of having established stronger market leadership due to first-mover strategy and a stronger ground network [28]. Strategically operating with almost 46% market share, the company recognizes priorities through network stability and coverage. Grameenphone has always been the market pioneer in terms of new service offering and superior service quality thanks to the support of Norwegian Telenor Group. This is because the company has been enjoying a very strong brand awareness and a loyal customer base.

Of Myanmar's telecom operators, Telenor announced its merger with Q-Telecom in September 2014 and actually commenced operations Robi Axiata, which merged with Airtel Bangladesh in 2016 and has become a significant market contender [29]. With market share of about 28 %, the operator has emerged to be unique in its continuity to integrate digital solutions and value added services to its products. The structure of market coverage has been improved by merger as now Robi has opted Airtel's strong position in urban areas and Robi has strong position in rural areas. The mobile firm has received adequate capital and technical support from its Malaysian investor Axiata group for the network and service rollout. Banglalink is the third largest operators who incessantly has hold the competition by offering extremely affordable price with focus on value added services. Holding approximately 21% of market share, the structure correctly found its place in the low cost segments, thus, at the same time, paying careful attention to the network quality and digital services [30]. Banglalink that is operating under the umbrella of the VEON Group has a consistent focus on the digital transformation and services [31].

Teletalk is the state operated mobile operator that stands in a unique position in the market environment. Despite occupying only about 5% of the market share, its role is not limited to business factors [30]. Being a government owned telecom, at many times Teletalk acts as a market beginner and provides an essential job of geographical coverage. The operator has always been the pioneer in introducing new technologies, which is evident from its leadership of the 3G service industry in Bangladesh [20].

### **3.2.2 Market dynamics**

This paper has identified several factors in Bangladesh' telecommunications market that define competition and go a long way in defining the strategies of operators in the market. Indications of price sensitive nature of the product are still clear, hence the continuous changes of the offers by operators in order to defend market share. But more dramatically there has been a transition from just the price competition to values-added services and digital solutions [20]. The key trend visible on the contemporary market is the shift toward relying on data services. Whereas, voice services are still contributing most of revenue, and adding data services are gaining more traction as the number of smartphone users and subscription to digital services increases. Operators are dedicating resources in network architecture to support this shift and are also creating new digital services to create value streams.

## **3.3 Technological Infrastructure and Development**

### **3.3.1 Evolution of network technologies**

Bangladesh's telecommunication infrastructure has undergone continuous improvement to meet rising data demands and customer expectations. The journey started with basic 2G networks supporting voice and limited data services. The subsequent introduction of 3G networks improved internet connectivity for urban areas, while 4G/LTE technology is now largely deployed to cater for high-speed data services. Experimental moves towards 5G signal the country's readiness for the next phase of digital transformation [21].

### 3.3.2 Emergence and expansion of digital services

Beyond the core network improvements, there has been substantial investment in complementary digital infrastructures, such as content delivery networks (CDNs), mobile financial services, and IoT platforms. These enhancements not only support the rise of digital services but also create a competitive edge for operators [22]. From an HR perspective, the integration of sophisticated digital platforms necessitates the adoption of new performance measurement and employee development tools—many of which are AI-enabled—to efficiently manage and upskill a technologically empowered workforce.

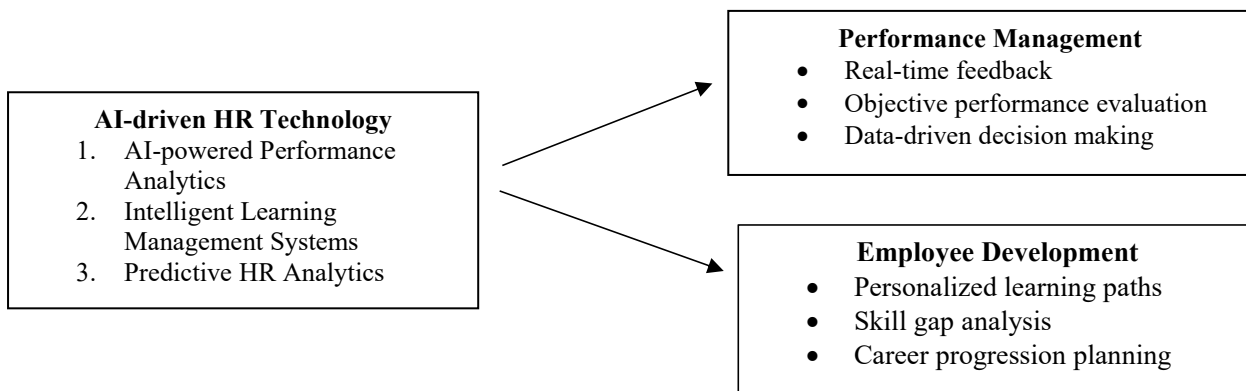
### 3.4 Summary and HR Context Implications

The telecommunication industry in Bangladesh has evolved from humble beginnings to become a fast-growing, competitive, and technologically advanced sector. Historical developments have set the foundation for modern market competition while continuous infrastructure investments have enabled the deployment of cutting-edge digital services. These industry changes create a direct ripple effect on HR practices by demanding more agile, data-driven, and strategic approaches to manage human resources across vast and diverse networks [33]. In this rapidly transforming landscape, AI-driven HR technologies offer a timely solution. By integrating predictive analytics, intelligent learning systems, and performance monitoring tools [27], HR departments can better align employee development and performance management with the fast pace of digital innovation. The industry's ongoing transformation underscores that the success of telecommunication companies depends not only on market competitiveness but also on their ability to effectively nurture and manage talent through advanced, technology-enabled HR practices [34].

## 4 RESEARCH FRAMEWORK AND HYPOTHESES

### 4.1 Conceptual Framework

The conceptual framework illustrates the relationships between the key variables in this study (Figure 1):



**Figure 1** Conceptual Framework

### 4.2 Research Hypotheses

Based on the theoretical and conceptual frameworks, the following hypotheses are proposed:

H1: The implementation of AI-powered Performance Analytics is positively associated with employee development in telecommunication companies in Bangladesh.

H2: The implementation of AI-powered Performance Analytics is positively associated with improved performance management in telecommunication companies in Bangladesh.

H3: The use of Intelligent Learning Management Systems is positively associated with enhanced employee development in telecommunication companies in Bangladesh.

H4: The use of Intelligent Learning Management Systems is positively associated improved performance management in telecommunication companies in Bangladesh.

H5: The adoption of Predictive HR Analytics is positively associated with enhanced employee development in telecommunication companies in Bangladesh.

H6: The adoption of Predictive HR Analytics is positively associated with improved performance management in telecommunication companies in Bangladesh

## 5 METHODOLOGY

### 5.1 Research Design

Research design is a systematic approach for collecting and analyzing data, selecting among competing hypotheses. Present study is a cross sectional design study which provides the data and conclusions in a specific timeframe from July 2024 to September 2024. However, data from the present study consists of the supervisor's perspective of AI driven HR technologies for the performance management and employee development. A questionnaire survey constituted the principal measurement instrument used in the present investigation.

## 5.2 Sample, Population and Unit of Analysis

Employees working in the telecommunications industry in Bangladesh are the population for this study. One of the most thriving industries of Bangladesh is the sector of telecommunication world where the whole country is virtually connected with each other and big workforce is found in different levels and levels of telecommunication companies. Due to its significant adoption of AI powered HR technologies as well as advanced human resource management systems, this industry was selected as it would provide a good direction for analyzing the relationship between AI enabled HR analytics, employee development and performance management.

Data was collected from the employees working in the telecommunication companies in Bangladesh through purposive sampling technique. A total of 205 respondents from various organizational levels and departments have constituted the sample. The minimum sample size threshold for PLS-SEM analysis is at least ten time the maximum number of paths pointing to the same construct in the structural model, and this sample size exceeds it. Because our most complex endogenous construct requires four paths, the minimum sample size required is 40, much less than our sample of 205, which we will find allows us to conduct robust statistical analysis [35].

This study takes the individual employee level as the unit of analysis due to its exploration of individual employee perceptions and experiences with AI enabled HR systems and the impact on employee development and performance management. The 251 respondents were employees with direct experience on or exposure to their organization's HR analytics systems, performance management processes, and development programs. The choice of unit of analysis concurs with the study objectives, and it includes understanding how HR technologies powered with Artificial intelligence (AI) impacts individual employee outcomes and organizational HR processes.

## 5.3 Data Collection

We collected data for our research by mailing out a Google Form to gather data online. For our research, we asked respondents to respond. Moreover, our questionnaire contains two parts. Our first segment of our questionnaire consisted of open-ended questions related to demographics. Age, gender, organizational role as well as industry tenure make up demographic data. The second part comprises of 25 questions shown in 5 segments.

## 5.4 Measures

The participants responded to a structured questionnaire measuring their perceptions across five key constructs: Ways in which AI is transforming the HR field include AI powered Performance Analytics (APA), Intelligent Learning Management Systems (ILM), Predictive HR Analytics (PHA) Employee Development (ED), Performance Management (PM). Multiple items measured each construct via a five point Likert Scale, from strongly disagree (1) to strongly agree (5), to achieve inclusive measurement of theoretical constructs being measured.

## 5.5 Data Analysis Procedure

The partial least squares structural equation modeling (PLS-SEM) approach was utilized in this study, using SmartPLS 3.0 software. This was selected as the primary analytical tool on the grounds of its applicability to complex models with multiple constructs and relationships, treatment in PLS-SEM theory development, and research applications (predictive nature) (Hair et al. 2019). The analysis followed a systematic two-stage approach: Overviewing assessment of the construct reliability, followed by validity, first on the measurement model and then the structural model.

The constructs were then investigated to evaluate the measurement model starting with the reliability and validity. Factor loadings were used to assess individual item reliability with values of 0.7 and higher deemed acceptable, but values between 0.5 and 0.7 were retained as long as the values did not lower composite reliability. Cronbach's Alpha and composite reliability (CR) were used to assess internal consistency reliability and threshold values of 0.7 or more were taken as satisfactory compliance.

In determining convergent validity, Average Variance Extracted (AVE) was considered where the values above 0.5 convey that the constructs interpret more than 50% variance in their indicators. Discriminant validity was examined using two criteria: Fornell-Larcker criterion that compares the square root of AVE values with latent variable correlations and Heterotrait-Monotrait ratio (HTMT) which requires values less than 0.90 are satisfactory discriminant validity.

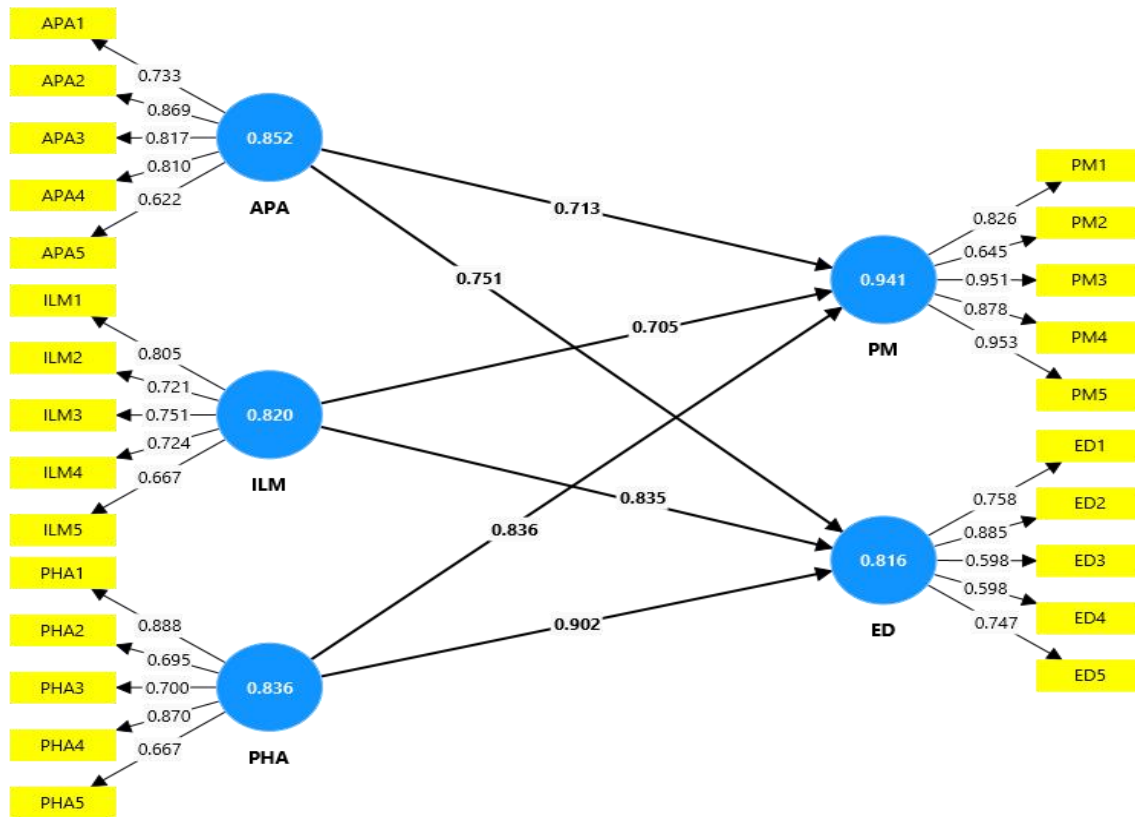
Using the bootstrapping procedure in SmartPLS, with 5000 resamples, t-values and confidence intervals were obtained to test the hypotheses. Path coefficients were evaluated for significance at different levels ( $p < 0.01$ , and  $p < 0.05$ ) to support the hypothesized relationships. The results were checked to be robust against the bias-corrected confidence intervals.



## 6 FINDINGS AND ANALYSIS

### 6.1 Measurement Model Assessment

In PLS-SEM analysis, the measurement model evaluation is the first step. Composite reliability, indicator reliability, reflectively measured components, convergent validity, and discriminant validity were subsequently integrated into our study approach [35]. Evaluating the dependability of indicators is considered the first step in developing measurement models. Relevant constructs shed light on indicator dependability, which in turn evaluates indication variance [36]. Additionally, these numbers should not exceed 0.70 and are shown by outer loadings [37]. In social science research, researchers frequently come into outer loadings that are lower than 0.70, even though a factor loading of 0.7 is ideal [38]. We will evaluate how removing indicators affects composite reliability, content validity, and convergent validity instead than just dismissing them (Figure 2).



**Figure 2** Measurement model (Outer loading, Correlations and Cronbach's Alpha)

The measurement model analysis reveals robust reliability across all constructs as evidenced by their Cronbach's alpha values. The AI-powered Performance Analytics (APA) construct demonstrates strong reliability with a Cronbach's alpha of 0.852. Similarly, Intelligent Learning Management (ILM) shows solid internal consistency with a value of 0.820, while Predictive HR Analytics (PHA) exhibits reliable measurement properties with 0.836. Performance Management (PM) displays the highest reliability score at 0.941, and Employee Development (ED) maintains good reliability with 0.816. All these values substantially exceed the recommended threshold of 0.7, confirming strong internal consistency reliability across the measurement model.

The factor loading analysis provides detailed insights into individual indicator reliability. Within the APA construct, indicators show predominantly strong loadings, with APA2 (0.869), APA3 (0.817), and APA4 (0.810) demonstrating robust reliability. APA1 maintains acceptable reliability at 0.733, while APA5 shows a moderate loading of 0.622. The ILM construct presents a similar pattern, with ILM1 showing the strongest loading at 0.805, followed by satisfactory loadings for ILM2 (0.721), ILM3 (0.751), and ILM4 (0.724), with ILM5 showing an adequate loading of 0.667.

The PHA construct exhibits particularly strong measurement properties through PHA1 (0.888) and PHA3 (0.870), complemented by acceptable loadings from PHA2 (0.695) and PHA4 (0.870), though PHA5 shows a moderate loading of 0.667. The PM construct emerges as one of the strongest in terms of indicator reliability, with exceptionally high loadings for PM3 (0.951) and PM5 (0.953), strong showings from PM1 (0.826) and PM4 (0.878), and an acceptable loading from PM2 (0.645). The ED construct demonstrates varied but acceptable reliability levels, with ED2 showing the strongest loading at 0.885, followed by good loadings from ED1 (0.758) and ED5 (0.747), while ED3 and ED4 maintain adequate loadings at 0.598.

The path coefficients in the model reveal significant relationships between constructs. The strongest relationship exists between PHA and ED with a coefficient of 0.902, indicating a robust predictive relationship. Substantial relationships

are also observed between ILM and ED (0.835), and PHA and ILM (0.836). The model also shows meaningful connections between APA and PM (0.713), and ILM and PM (0.705), suggesting significant theoretical and practical relationships between these constructs.

Overall, the measurement model demonstrates strong structural validity. While most indicators exceed the preferred loading threshold of 0.7, those few indicators falling between 0.5 and 0.7 remain within acceptable limits for academic research. The combination of strong reliability scores, substantial factor loadings, and meaningful path coefficients suggests a robust measurement model that effectively captures the theoretical constructs under investigation (Table 1).

**Table 1** Factors Loadings, Reliability, and Convergent Validity

Construct	Item	Loading	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
AI-powered Performance Analytics	APA1	0.733	0.835	0.852	0.881	0.601
	APA2	0.869				
	APA3	0.817				
	APA4	0.81				
	APA5	0.622				
ED	ED1	0.758	0.784	0.816	0.845	0.526
	ED2	0.885				
	ED3	0.598				
	ED4	0.598				
	ED5	0.747				
Intelligent Learning Management Systems	ILM1	0.805	0.804	0.82	0.854	0.54
	ILM2	0.721				
	ILM3	0.751				
	ILM4	0.724				
	ILM5	0.667				
Predictive HR Analytics	PHA1	0.888	0.823	0.836	0.878	0.593
	PHA2	0.695				
	PHA3	0.7				
	PHA4	0.87				
	PHA5	0.667				
Performance Management	PM1	0.826	0.907	0.941	0.932	0.737
	PM2	0.645				
	PM3	0.951				
	PM4	0.878				
	PM5	0.953				

The measurement model demonstrates strong psychometric properties across all constructs through multiple reliability and validity indicators. The AI-powered Performance Analytics (APA) construct exhibits robust reliability with a Cronbach's alpha of 0.835 and composite reliability (rho\_c) of 0.881, accompanied by a satisfactory Average Variance Extracted (AVE) of 0.601. The construct's indicators show strong loadings, particularly APA2 (0.869), APA3 (0.817), and APA4 (0.810), while APA1 maintains acceptable reliability at 0.733, and APA5 shows adequate loading at 0.622. Employee Development (ED) demonstrates good reliability with a Cronbach's alpha of 0.784 and composite reliability of 0.845. The construct's AVE of 0.526 meets the threshold for convergent validity. ED2 emerges as the strongest indicator with a loading of 0.885, followed by solid loadings from ED1 (0.758) and ED5 (0.747), while ED3 and ED4 maintain adequate loadings at 0.598, suggesting acceptable indicator reliability.

The Intelligent Learning Management Systems (ILM) construct shows strong internal consistency with a Cronbach's alpha of 0.804 and composite reliability of 0.854. The construct achieves an AVE of 0.540, indicating satisfactory convergent validity. ILM1 demonstrates the strongest loading at 0.805, with ILM2 (0.721), ILM3 (0.751), and ILM4 (0.724) showing robust reliability, while ILM5 maintains an acceptable loading of 0.667.

Predictive HR Analytics (PHA) exhibits strong reliability measures with a Cronbach's alpha of 0.823 and composite reliability of 0.878. The construct's AVE of 0.593 indicates good convergent validity. PHA1 shows exceptional indicator reliability with a loading of 0.888, followed by PHA4 at 0.870. PHA2 (0.695), PHA3 (0.700), and PHA5 (0.667) maintain acceptable loadings above the minimum threshold.

Performance Management (PM) emerges as the strongest construct in terms of reliability, with an excellent Cronbach's alpha of 0.907 and composite reliability of 0.932. The construct also demonstrates the highest AVE at 0.737, indicating superior convergent validity. PM3 (0.951) and PM5 (0.953) show exceptionally strong loadings, supported by robust loadings from PM1 (0.826) and PM4 (0.878), while PM2 maintains an acceptable loading of 0.645.

The measurement model's overall assessment reveals strong reliability across all constructs, with Cronbach's alpha values ranging from 0.784 to 0.907, and composite reliability values from 0.845 to 0.932. The AVE values for all constructs exceed the recommended threshold of 0.5, ranging from 0.526 to 0.737, confirming satisfactory convergent validity. The combination of strong reliability coefficients, adequate AVE values, and predominantly high factor

loadings suggests a robust measurement model that effectively captures the theoretical constructs under investigation (Table 2).

**Table 2** Fornell-Larcker Criterion

	APA	ED	ILM	PHA	PM
APA	0.775				
ED	0.705	0.726			
ILM	0.808	0.835	0.735		
PHA	0.794	0.902	0.902	0.77	
PM	0.713	0.715	0.751	0.836	0.858

The discriminant validity of the measurement model was assessed using two key criteria: the Fornell-Larcker criterion and the Heterotrait-Monotrait (HTMT) ratio. The Fornell-Larcker criterion examination reveals that the square root of AVE for each construct (displayed on the diagonal) is higher than its correlation with other constructs in most cases. AI-powered Performance Analytics (APA) demonstrates a square root of AVE of 0.775, which is adequately higher than its correlations with most other constructs, ranging from 0.705 to 0.808. Employee Development (ED) shows a square root of AVE of 0.726, while Intelligent Learning Management Systems (ILM) displays a value of 0.735. Predictive HR Analytics (PHA) and Performance Management (PM) exhibit strong values of 0.770 and 0.858 respectively.

The correlation analysis through the Fornell-Larcker criterion indicates several strong relationships between constructs. Notably, there is a substantial correlation between PHA and ED (0.902), as well as between PHA and ILM (0.902), suggesting strong theoretical relationships between these constructs. The correlation between ILM and ED (0.835) and PHA and PM (0.836) also indicates robust relationships, while maintaining discriminant validity. The moderate to strong correlations between APA and other constructs (ranging from 0.705 to 0.808) suggest meaningful relationships while preserving construct distinctiveness (Table 3).

**Table 3** HTMT

	APA	ED	ILM	PHA	PM
APA					
ED	0.737				
ILM	0.972	0.895			
PHA	0.91	1.038	1.027		
PM	0.782	0.796	0.751	0.958	

The HTMT ratio analysis provides a more stringent assessment of discriminant validity. The results show that most relationships meet the conservative threshold of 0.90, though some exceed it. The relationship between ILM and APA shows an HTMT ratio of 0.972, while PHA demonstrates ratios of 1.038 with ED and 1.027 with ILM. These values slightly exceed the conservative threshold, suggesting some potential overlap in construct measurements. However, the relationship between PM and other constructs shows acceptable HTMT ratios ranging from 0.751 to 0.958, indicating adequate discriminant validity for these relationships.

The combination of both Fornell-Larcker and HTMT analyses suggests that while most constructs demonstrate adequate discriminant validity, there are some areas where constructs show high correlation and potential overlap, particularly in the relationships involving PHA, ILM, and ED. This finding is not uncommon in closely related theoretical constructs within the same domain and does not necessarily indicate problematic measurement properties, especially given the strong reliability and convergent validity demonstrated in the previous analyses. The overall assessment suggests that while the constructs are closely related, they maintain sufficient distinctiveness to be considered separate theoretical entities in the structural model.

## 6.2 Structural Model

The bootstrap model analysis reveals significant insights into the structural relationships between the constructs under investigation. The model demonstrates substantial explanatory power, with R-square values of 0.817 for Employee Development (ED) and 0.707 for Performance Management (PM), indicating that the model explains 81.7% and 70.7% of the variance in these dependent variables respectively.

The path analysis reveals varying levels of significance across different relationships. The relationship between AI-powered Performance Analytics (APA) and Performance Management shows statistical significance with a p-value of 0.009, indicating a meaningful direct effect. This supports the theoretical expectation that AI-powered analytics capabilities contribute positively to performance management outcomes. However, the path between APA and

Employee Development shows a p-value of 0.312, suggesting this relationship is not statistically significant at the conventional threshold [40].

Intelligent Learning Management Systems (ILM) demonstrates a significant relationship with Employee Development (p-value = 0.029), supporting the theoretical framework linking learning management capabilities to employee development outcomes. Conversely, the path between ILM and Performance Management yields a p-value of 0.213, indicating a non-significant relationship that does not support the hypothesized connection between these constructs.

Predictive HR Analytics (PHA) emerges as a particularly strong predictor in the model, showing highly significant relationships (p-value = 0.000) with both Employee Development and Performance Management. This suggests that predictive analytics capabilities play a crucial role in both development and performance outcomes within the organizational context (Figure 3, Table 4-5).

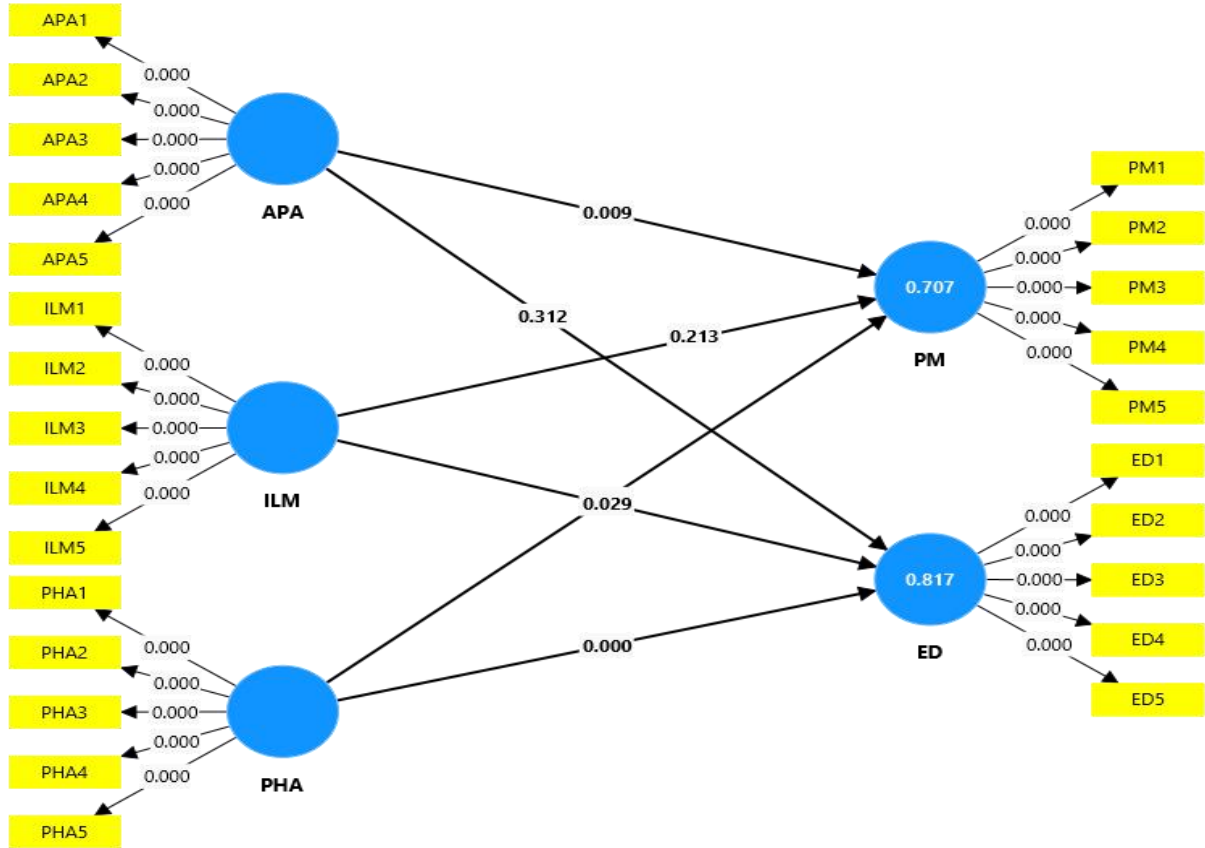


Figure 3 Bootstrap Model

Table 4 R-square and R-square Adjusted

	R-square	R-square adjusted
Employee Development	0.817	0.814
Performance Management	0.707	0.703

Table 5 Hypothesis Analysis

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics ( O/STDEV)	P values	Hypothesis
APA -> ED	-0.065	-0.065	0.065	1.011	0.312	Not supported
APA -> PM	0.159	0.16	0.061	2.619	0.009	Supported
ILM -> ED	0.15	0.16	0.068	2.19	0.029	Supported
ILM -> PM	-0.1	-0.095	0.081	1.244	0.213	Not supported
PHA -> ED	0.818	0.809	0.063	12.961	0	Supported
PHA -> PM	0.8	0.797	0.088	9.046	0	Supported

The hypothesis analysis reveals varying levels of support for the proposed relationships in the structural model. The relationship between AI-powered Performance Analytics (APA) and Employee Development (ED) shows a negative path coefficient ( $\beta = -0.065$ ,  $t = 1.011$ ,  $p = 0.312$ ), failing to achieve statistical significance and thus not supporting the hypothesized relationship. However, APA demonstrates a significant positive relationship with Performance Management (PM) ( $\beta = 0.159$ ,  $t = 2.619$ ,  $p = 0.009$ ), providing support for this hypothesis with a satisfactory effect size. Intelligent Learning Management Systems (ILM) exhibits a significant positive relationship with Employee Development ( $\beta = 0.150$ ,  $t = 2.190$ ,  $p = 0.029$ ), supporting the hypothesized connection between these constructs. Conversely, the relationship between ILM and Performance Management shows a negative coefficient ( $\beta = -0.100$ ,  $t = 1.244$ ,  $p = 0.213$ ), failing to achieve statistical significance and thus not supporting this hypothesis.

Predictive HR Analytics (PHA) emerges as the strongest predictor in the model, demonstrating highly significant relationships with both dependent variables. The relationship between PHA and Employee Development shows a substantial positive effect ( $\beta = 0.818$ ,  $t = 12.961$ ,  $p < 0.001$ ), while the relationship with Performance Management also demonstrates strong positive influence ( $\beta = 0.800$ ,  $t = 9.046$ ,  $p < 0.001$ ). Both relationships provide robust support for their respective hypotheses with notable effect sizes.

H1: sig. value .312 > .05; H1 rejected; The implementation of AI-powered Performance Analytics is positively associated with employee development in telecommunication companies in Bangladesh.

H2: sig. value .009 < .05; H2 accepted; The implementation of AI-powered Performance Analytics is positively associated with improved performance management in telecommunication companies in Bangladesh.

H3: sig. value .029 < .05; H3 accepted; The use of Intelligent Learning Management Systems is positively associated with enhanced employee development in telecommunication companies in Bangladesh.

H4: sig. value .213 > .05; H4 rejected; The use of Intelligent Learning Management Systems is positively associated improved performance management in telecommunication companies in Bangladesh.

H5: sig. value .000 < .05; H5 accepted; The adoption of Predictive HR Analytics is positively associated with enhanced employee development in telecommunication companies in Bangladesh.

H6: sig. value .000 < .05; H6 accepted; The adoption of Predictive HR Analytics is positively associated with improved performance management in telecommunication companies in Bangladesh.

**Table 6** Relationship Bias-Ness

Construct	Bias	2.50%	97.50%
APA -> ED	0	-0.196	0.054
APA -> PM	0.001	0.028	0.266
ILM -> ED	0.01	0.02	0.286
ILM -> PM	0.005	-0.242	0.07
PHA -> ED	-0.009	0.698	0.943
PHA -> PM	-0.004	0.618	0.967

The relationship bias-ness analysis provides additional insight into the stability and reliability of these findings through confidence intervals (Table 6). The APA to ED relationship shows a confidence interval ranging from -0.196 to 0.054, with zero bias, confirming the non-significance of this relationship. The APA to PM relationship demonstrates a positive confidence interval (0.028 to 0.266) with minimal bias (0.001), supporting the robustness of this significant relationship.

ILM's relationship with ED shows a positive confidence interval (0.020 to 0.286) with a small positive bias (0.010), reinforcing the significance of this relationship. The ILM to PM relationship's confidence interval (-0.242 to 0.070) with minimal bias (0.005) confirms its non-significance. PHA's relationships show strong confidence intervals for both ED (0.698 to 0.943) and PM (0.618 to 0.967), with minimal negative biases (-0.009 and -0.004 respectively), supporting the robustness of these strong relationships.

Overall, the analysis provides strong support for four of the six hypothesized relationships, with PHA demonstrating particularly robust effects on both outcome variables. The confidence intervals and bias analysis further validate these findings, suggesting a reliable and stable model structure despite the non-significance of two hypothesized relationships [41].

## 7 DISCUSSION

### 7.1 Impact of AI-powered Performance Analytics (APA)

Interestingly, the impact of AI powered Performance Analytics was found to create an interesting dichotomy. Results showed that higher levels of APA had a significant positive relationship with performance management ( $\beta = 0.159$ ,  $p = 0.009$ ), somewhat surprisingly, it was demonstrated that the relationship between APA and employee development ( $\beta = -0.065$ ,  $p = 0.312$ ) was not significant. This finding demonstrates that the use of APA tools was more adequate for the purposes of monitoring and performance assessment rather than for developmental purposes [43].

Previous literature regarding AI driven analytics has also supported positive impact on performance management, as it helps improve decision making accuracy and objectivity in performance evaluation. But, there was no evidence of a significant effect on employee development, which begs the point of how these analytics tools are being used. Could this disconnect indicate that organizations are using APA only to evaluate versus truly creating potential for developmental opportunities [39].

## 7.2. Role of Intelligent Learning Management Systems (ILM)

The findings regarding Intelligent Learning Management Systems shows an interesting pattern. Employee development was found to be related significantly positively to ILM ( $\beta = 0.150$ ,  $p = 0.029$ ), whereas there was no significant impact to performance management ( $\beta = -0.100$ ,  $p = 0.213$ ). It would appear that ILM systems are being used to support learning and development in a way that enables people to develop but that they may not be being used to support performance management related needs.

The investment in intelligent learning platforms gives a positive impact on employee development, which means that AI enabled learning system is able to develop skill, and facilitates in knowledge acquisition. On the other hand, the non-significant relationship with performance management suggests a possible opportunity for learning outcomes to be directly tied to performance metrics; perhaps learning and performance management systems are missing a connection [42].

## 7.3 Predictive HR Analytics (PHA) Significance

Most influential technology was predictive HR analytics, which was found to be strongly positively related to both employee development ( $\beta = 0.818$ ,  $p < 0.001$ ) and performance management ( $\beta = 0.800$ ,  $p < 0.001$ ). The extremely robust findings indicated that PHA is a cornerstone technology that effectively bridges the development and performance outcome divide.

The strong impact of PHA across both domains indicates several key insights:

- Effective utilization of predictive analytical capabilities is being used for both developmental planning as well as performance optimization
- Predictive insight is being successfully leveraged by organizations to create meaningful relationships between perceived development activities and performance outcomes
- Other AI-enabled technologies may be less mature or have a worse fit with HR processes than PHA tools

## 8 THEORETICAL IMPLICATIONS

This study contributes to the theoretical understanding of AI-enabled HR technologies in several ways. The study finds that HR technologies are effective mainly because of the integration they provide in process and other systems along with their own capabilities. This supports and extends current theories in the domain of technology adoption and integration in organizational contexts. The varied impacts of different technologies on development versus performance outcomes indicate the need for a more nuanced theoretical framework to make sense of the alignment of different HR technologies with different organizational objectives. The results are consistent across both outcome domains, supporting a theoretical model in which predictive capabilities lay the foundation for other HR technology implementations.

## 9 PRACTICAL IMPLICATIONS

The findings yield several important practical implications for organizations. The impact of predictive HR analytics capabilities is particularly strong on the outcomes of both development and performance, so organizations should invest in these capabilities. Different technologies are not equally effective, and need better integration between learning management systems and performance management processes. AI-powered performance analytics should be reviewed by organizations on how they can be applied in your organization, potentially beyond performance evaluation, to support development initiatives. Better alignment of certain HR technology systems is needed in order to improve the coherence of employee development and performance management processes.

## 10 LIMITATIONS AND FUTURE RESEARCH

Several limitations of this study present opportunities for future research. Such as It is limited to generalizability to telecommunication companies in Bangladesh. Further research should study these relationships in other cultural and industrial contexts. Since not all technologies perform equally, they might be also at different maturity level. Such relationships may be studied longitudinally and reveal how they change over time as the technology matures. Future research is needed to examine the drivers of effective integration activities in different HR technologies and its effect on organizational outcomes. Future research could examine mediating variables that help to explain the difference effects of these technologies on development and performance outcomes.

## 11 CONCLUSION

This study analysis the effects of Artificial intelligence in the human resource technologies on performance management and also explored different technological intervention on employee development in telecom sector of Bangladesh to explore the knowledge about the effectiveness of those interventions. The study focused on three key components: AI-based Performance Analytics, Intelligent Learning Management Systems and Predictive Human Resource Analytics each showing differential form of influence on organizational performance.

The findings of the empirical work imply that Performance Analytics has a moderate bar on application on performance management and a negligible effect on employee development. This result indicates that although APA strengthens PME tools, the use of APA for development issues may need some fine-tuning. On the other hand, Intelligent Learning Management Systems only registered mixed feedback by the employees, with positive results on learning management, yet with little effects on performance management. This result highlights the need to apply different technologies depending on what they perform best.

Structured HR Analytics was examined as the most reliable technological integration, which was positively correlated to performance management & employee development. The large value of path coefficients, as well as the significance of the values proves the fact that the PHA itself is a key general technology for enhancing the HR system comprehensively, and as such, should be prioritized within the framework of the technological approaches to the issue.

By doing so, these findings strengthen the extant literature on HRIS and suggest theoretical and practical roads to advance the comprehensiveness of AI-facilitated HR technologies. From a theoretical footing, the study supports the diverse effect generated by numerous AI technologies in HR environments, At the applied level, the study provides direction to Bangladeshi telecom firms as to the better ways of deploying technologies. The research especially emphasizes the need to fit technology to organizational goals and objectives as opposed to the generic approach to IT implementation.

Despite outlining the research benefits, this study also points to research gaps that need future attention, such as the overall existence of the positive AI-driven HR implementations beyond this study duration as well as the influence of organizational culture on technology. However, the relationships detected in this study also signal possibilities of investigating these relationships in different industry contexts, including the telecommunications sector in Bangladesh where this research was grounded.

The paper finally substantiates the fact that the coverage of artificial intelligence in the field of human resource management implies the relevance of a proper match between technological opportunities and organizational goals. These findings are particularly useful for the emerging organizations to provide general knowledge and directions to adopt innovative technologies in strategic human resource management practices as the Bangladeshi telecommunication companies progress in the era of digitalization. It is for this reason that implementation strategies need to be strategic reflecting the differential effects of the diverse technologies While at the same time it appears that predictive analytics could constitute a fundamental platform for the development of the HR technologies infrastructure.

From these conclusions, actual steps prospective for the BCMTs in Bangladesh are outlined, in terms of the incorporation of AI technologies into the firm's HR processes. The presented research points toward the conclusion that adoption of different technologies has its individual characteristics and advantages, and more careful approach to integration, which focuses on coming to better performance management and training results improvement, is necessary to achieve top results most of the time on the basis of technologies with the best predictive analytics potentialities.

## **COMPETING INTERESTS**

The authors have no relevant financial or non-financial interests to disclose.

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