

## MEASURING THE IMPACT OF EHR-INTEGRATED BALANCED SCORECARDS ON HEALTHCARE HRM PERFORMANCE AND PATIENT OUTCOMES AT PGIMS ROHTAK

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Dr. Bajrang Lal\*  
Kirti\*\*

### ABSTRACT

*The combination of Electronic Health Records (EHRs) and Balanced Scorecards (BSC) has become a key tactic in the dynamic field of healthcare management to enhance patient outcomes and performance. The purpose of this study, carried out at PGIMS Rohtak, was to look into how patient outcomes and HRM practices were affected by EHR-BSC integration. In this study, Pearson correlation coefficient was used. 82 healthcare professionals made up the sample, and their participation shed light on the connections between these factors. The results partially supported Hypothesis 1 by showing a somewhat favourable association between EHR integration and the idea that EHR-integrated BSC can improve healthcare administration. Nevertheless, there was no discernible relationship between HRM performance metrics and EHR-BSC integration. Large support for Hypothesis 3 was provided by the strikingly large correlations that were found between patient outcomes, such as safety, clinical results, and patient satisfaction, and EHR integration with BSC. This study concludes by highlighting the potential advantages of integrating EHRs with BSCs for improving patient outcomes and healthcare management practices. These findings provide insightful information for healthcare organizations looking to enhance their approaches and, therefore, the quality of care provided to patients.*

**KEYWORDS:** *Electronic Health Records (EHRs), Balanced Scorecards (BSC), Human Resource Management (HRM), National Health Mission (NHM).*

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### Introduction

Technology improvements, especially the increasing use of EHRs, are driving a transformational change in the healthcare industry. EHRs have the potential to transform healthcare by facilitating better data accessibility, streamlining administrative procedures, and enhancing patient care. However, it is crucial to look into creative methods to connect EHRs with strategic management tools in order to maximize their potential and improve healthcare management practices. The balanced scorecard, developed by **Kaplan and Norton in the early 1990s**, has gained prominence as a strategic management tool in various industries. **A framework for measuring organizational performance using a more balanced set of performance measures.** BSC is one such instrument that has become well-known as a useful framework for performance monitoring and management in several industries, including healthcare. An new area in healthcare management, the integration of EHRs with BSCs is yet much researched, particularly with regard to how it may affect the effectiveness of HRM.

The PGIMS in Rohtak, India, is the setting for this study's healthcare ecosystem. A renowned institution, PGIMS Rohtak is dedicated to offering top-notch medical care to a wide range of patients. PGIMS Rohtak is the right location for this research project given its commitment to new methods and its drive to improve healthcare management.

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\* Assistant Professor, Department of Commerce & Management, NIMS University, Jaipur, Rajasthan, India.

\*\* Research Scholar, Department of Commerce & Management, NIMS University, Jaipur, Rajasthan, India.

Although the use of EHRs in healthcare has shown to significantly increase administrative effectiveness and data management, further research is still needed to determine how EHR adoption has affected HRM and patient outcomes more broadly. BSCs have also been frequently used in healthcare management to coordinate company goals, track key performance indicators, and improve decision-making.

This study aims to fill the knowledge gap by maximizing HRM practices, elevating healthcare management approaches, and improving the general standard of patient care. The lack of thorough research examining the combined impact of EHR and BSC in healthcare highlights the necessity and importance of this investigation. Understanding the effects of EHR-integrated BSC also becomes more important as healthcare organizations try to provide more patient-centric care while effectively managing resources.

The main goal of this study is to clarify the dynamic interactions between technology, strategic management, human resource management, and patient outcomes in the setting of PGIMS Rohtak. By doing this, it hopes to provide evidence-based insights that can both improve PGIMS' healthcare management practices and serve as a model for other healthcare institutions around the world that are attempting to use technology and strategic management to improve HRM performance and the standard of patient care. This study has the potential to improve the way healthcare facilities run, which will eventually help both the people they serve and the healthcare professionals who deliver it.

### **Overview of EHR with BSC in Healthcare Industry**

The broad implementation of EHRs is causing a dramatic upheaval in India's healthcare system. EHRs digitize patient health data and offer a thorough digital perspective of a patient's medical history, increasing patient care and streamlining healthcare operations. However, healthcare institutions are increasingly turning to strategic management frameworks like the BSC to make sure that the installation of EHRs optimizes their benefits and corresponds with corporate goals. A useful tool in healthcare administration, the balanced scorecard is a performance evaluation and management tool that aids businesses in matching their operations with their strategic goals.

### **Recent trends in EHR Adoption**

EHR use across healthcare organizations has notably increased in India in recent years. Several variables impact this change, including:

- **Governmental Initiatives:** The NHM and the Digital India campaign are two government-sponsored programs that place a strong emphasis on the digitalization of medical records. These initiatives seek to increase data accessibility, lower medical mistakes, and raise the standard of healthcare overall.
- **Technological developments:** With the introduction of sophisticated EHR systems, cloud computing, and mobile health apps, healthcare providers may now deploy EHRs more easily and affordably.
- **Patient-Centric Care:** Medical professionals are realizing the value of patient-centric care more and more. EHRs improve patient involvement because they make it easier for patients to access their medical information and connect with healthcare providers.
- **Challenges in EHR Implementation:**
- Despite the encouraging developments, there are still a number of implementation hurdles for EHRs:
- **Cost of Implementation:** Adopting EHRs can be expensive for healthcare facilities, particularly for smaller clinics and outlying medical facilities. Budgets may be put under stress by investments in infrastructure, technology, and training.
- **Data security and privacy:** Protecting patient data's security and privacy is a top priority. Healthcare firms are required to follow data protection laws and put strong cybersecurity safeguards in place.
- **Interoperability:** It is still difficult to get multiple EHR systems to work together. For thorough patient care, healthcare professionals must communicate data in an efficient manner.

### Role of BSC

In recent years, the integration of EHR with the Balanced Scorecard has gained more significance. Healthcare businesses may use the BSC as a formal framework to connect their EHR adoption with strategic goals and thoroughly assess its impact. This is how the BSC is essential:

- **Cost Perspective:** Using the BSC, hospitals and clinics may assess the cost effects of adopting an EHR. It aids in evaluating cost reductions, income creation, and return on investment (ROI).
- **Customer Perspective:** By enabling prompt access to medical records and enhancing service standards, EHRs improve the patient experience. The BSC enables healthcare professionals to gauge patient loyalty and satisfaction.
- **Internal Process Perspective:** EHRs improve healthcare workflows by streamlining internal procedures and eliminating paperwork and mistakes. To maintain operational effectiveness, the BSC assists in monitoring key process indicators.
- **Learning and Growth Perspective:** It is necessary for successful EHR deployment inside healthcare organizations. The BSC helps assess staff education, technological acceptance, and cultural changes required for successful EHR integration.

### Benefits of EHR-BSC

For healthcare businesses in India, integrating EHRs with the Balanced Scorecard offers a number of benefits:

- **Strategic Alignment:** By ensuring that EHR adoption is in line with the organization's strategic goals, the BSC aids in the long-term success of hospitals and clinics.
- **Performance Measurement:** It offers a well-organized framework for assessing how EHRs affect various operational, financial, and patient-related indicators.
- **Continuous Improvement:** The BSC promotes a culture of continuing learning and development, which is crucial for maximizing the use of EHRs and fostering continuous development.
- **Data Driven Decision Making:** EHRs offer a plethora of data, and the BSC assists healthcare practitioners in making knowledgeable decisions by concentrating on the most pertinent key performance metrics.

### Opportunities of EHR with BSC in Healthcare

Numerous potential exist to enhance patient care and healthcare administration through the combination of EHR and the BSC. Here are several significant chances:

- **Data-Driven Decision-Making:** Harness patient data for informed decisions on HRM and patient care.
- **Improved Patient Outcomes:** Track and enhance clinical results, patient satisfaction, and safety.
- **Enhanced Efficiency:** Streamline administrative processes, reduce paperwork, and optimize resource use.
- **Quality Improvement:** Drive continuous quality improvements using real-time performance data.
- **Patient-Centric Care:** Access comprehensive patient data to focus on patient needs and satisfaction.
- **Benchmarking:** Compare performance against industry standards for innovation and improvement.
- **Employee Engagement:** Measure staff satisfaction and retention, boosting morale and productivity.
- **Cost Control:** Identify cost-saving opportunities by pinpointing inefficiencies.
- **Research and Analysis:** Facilitate epidemiological and clinical studies with extensive patient data.

## Review of Literature

**Hraiga RA, Fadel AM, Abbas AA. (2023)**, The purpose of this study is to clarify the application of the BSC technique and its role in evaluating the overall performance of an economic entity and in particular the performance of total productive maintenance. The research has selected the Sulfuric Acid Factory in Al-Furat Company for Chemical Industries and Pesticides as a sample for the study. The most important finding is that the application of the BSC card technique, based on measures that affect overall productive maintenance, contributes to evaluating the overall performance of an economic entity and evaluating total productive maintenance activities.

**Adler-Milstein J, Green CE, Bates DW (2023)** The financial implications of using EHRs are a source of uncertainty for healthcare providers. Over a five-year period, physicians would lose \$43,743 on average, according to a survey of 49 practices. Even with the \$44,000 federal incentive, just 27% of investors would realize a profit. EHRs were employed by profitable clinics to boost income through better billing or by seeing more patients. Because they kept using paper records, half of the practices did not save money on them. Particularly for smaller operations, more assistance and regulatory changes—like growing regional extension centre programs—might be required to guarantee favourable returns.

**Modi S, Feldman SS (2022)** The 2009 Health Information Technology Act helped to popularize EHRs, which store patient health data from medical visits. This analysis examines the value that EHRs provide, breaking it down into financial and clinical results. After 971 articles were first found using the PRISMA approach, 58 of them were chosen for ATLAS.ti (version 8.2) analysis. The analysis reveals that EHRs have conflicting implications on clinical and financial results. Remarkably, 9% of research examined the connections between these areas, and 80% of those found that the use of EHRs was positively correlated with these results. This group's viewpoint defies common wisdom by speculating that higher productivity may result in further IT expenditures.

**Wardhani RT, Jati SP, Kartasurya MI (2022)** The objective of the study is to analyse the factors of BSC, customer and employee satisfaction in Dr.Kariadi Hospital. The number samples used 72 consumer respondents who use hospital services and 27 hospital staff. The research method uses a BSC and analysis of customer and employee satisfaction component factors. The results of the analysis suggest that the human resource factor still needs improvement compared to the customer factor. This study confirms that efforts have been made to provide the best service to satisfy customers.

**Ojah HK, Malik YS, Ali AM (2019)** carried out research on the use of balanced scorecards in evaluating and improving healthcare organizations' performance. The key hypothesis of the study is that performance is improved in addition to being evaluated when using the balanced scorecard. The study used both analytical and descriptive methodologies, examining actual financial data from the healthcare industry as well as conceptually establishing research variables. The study discovered that the healthcare facilities in the sample obtained a score of 89.07% utilizing a thorough set of criteria. This emphasizes how crucial it is to concentrate on operational outcomes and customer happiness in order to achieve successful results.

### Objectives of the Study

- Assessing the current status of EHR integration and HRM practices.
- Implementing EHR-integrated Balanced Scorecards within the organization.
- Analysing the effects of EHR-integrated BSC on HRM performance indicators, such as staff productivity, satisfaction, and retention.
- Investigating the relationship between HRM performance, as influenced by EHR-integrated BSC, and patient outcomes.
- Evaluating the impact of EHR-integrated BSC on patient outcomes, including patient satisfaction, clinical outcomes, and safety.

### Hypothesis of the Study

- H<sub>1</sub>:** There is significant relationship between the integration of EHR with BSC and the current status of HRM practices.
- H<sub>2</sub>:** There is no significant relationship between the implementation of EHR-integrated Balanced Scorecards within PGIMS Rohtak and the HRM performance indicators, including staff productivity, satisfaction, and retention.
- H<sub>3</sub>:** There is significant relationship between the integration of EHRs with BSC and patient outcomes at PGIMS Rohtak, including patient satisfaction, clinical outcomes, and safety.

### Research Methodology

- **Research Design:** In order to investigate the links between factors pertaining to the integration of EHRs with BSC and their effects on patient outcomes, HRM practices, and healthcare management, this study used a quantitative research approach. The research technique offers a methodical way to use a quantitative research design and the Pearson correlation coefficient to look at the links between the variables of interest in your study.

### Population and Sample

- **Population:** All medical professionals employed at PGIMS Rohtak who are pertinent to the study's goals make up the population. Physicians, nurses, office workers, technicians and patients are examples of individuals with expertise and knowledge in the healthcare sector regarding the integration of EHRs with HRM methods, BSC, and patient outcomes.
- **Sample:** The study's sample comprises 82 healthcare professionals who work at PGIMS Rohtak. Because of practical limitations in data collection, participants were chosen through the use of a simple sampling technique. The study received replies from 82 persons who freely participated by filling out the structured questionnaires, despite the anticipated sample size of 100. A wide range of healthcare workers from various departments and functions within the healthcare organization are included in this sample.
- **Data Collection:** Participants were given standardized questionnaires to complete in order to gather data. The surveys asked about the participants' opinions on EHR integration, their happiness with HRM procedures, if they agreed that EHR-integrated BSC may improve healthcare management, and how far along they were with the implementation of EHR-integrated BSC.

### Data Analysis

To examine the connections between the variables, **Pearson's correlation coefficient (r)** was used. The direction and strength of these associations were ascertained using the Pearson correlation test. **For two-tailed tests, significance values were established at 0.05 and 0.01** (A 5-point Likert scale). The correlation coefficient's magnitude was used to classify correlations as **weak, moderate, or high**.

**Table 1: Relationship between the integration of EHR with BSC and the current status of HRM Practices**

	<b>EHR integration and Essentially</b>	<b>HRM practices Satisfaction</b>	<b>EHR-BSC Enhancement</b>	<b>Progress of EHR-BSC Implementation</b>
EHR integration and Essentially	1			
HRM practices Satisfaction	.148	1		
EHR-BSC Enhancement	.290**	.029	1	
Progress of EHR-BSC Implementation	.620**	.168	.148	1

\*\* . Correlation is significant at the 0.01 level (2-tailed).

There is a **marginally positive correlation**( $r = 0.148$ ,  $p > 0.05$ ) between HRM satisfaction and the belief in EHR integration.

There are **significant positive correlations**( $r = 0.620$ ,  $p < 0.01$ , and  $r = 0.290$ ,  $p < 0.01$ ) between contentment with progress and agreement, and belief in EHR-integrated Balanced Scorecards (EHR-BSC) for improved healthcare.

In conclusion, the results show that although there is a somewhat strong correlation between the belief in EHR integration and the belief that BSC integrated with EHRs can improve healthcare management, there is no significant correlation between this belief and the state of HRM practices or the implementation of EHR-integrated BSC at PGIMS Rohtak.

**Table 2: Relationship between the implementation of EHR-integrated Balanced Scorecards within PGIMS Rohtak and the HRM performance indicators, including staff productivity, satisfaction, and retention**

	Positive impact staff productivity	Satisfaction with HRM Practices	Enhance healthcare management	Staff satisfaction achieved through EHR-integrated BSC
Positive impact staff productivity	1			
Satisfaction with HRM Practices	.400**	1	.172	.148
Enhance healthcare management	-.078	.172	1	.341**
Staff satisfaction achieved through EHR-integrated BSC	.088	.148	.341**	1

\*\* Correlation is significant at the 0.01 level (2-tailed).

There is a **significant positive association**( $r = 0.400$ ,  $p < 0.01$ ) between employee productivity and HRM practices.

A **moderately favourable connection**( $r = 0.341$ ,  $p < 0.01$ ) has been seen between staff satisfaction and the view that healthcare management is improved by EHR-integrated BSC.

On the other hand, staff productivity and the notion that EHR-integrated BSC improves healthcare administration show a **modest negative association**( $r = -0.078$ ,  $p > 0.05$ ).

These results suggest that employee productivity and faith in the ability of EHR-integrated BSC to improve healthcare management are positively correlated with staff satisfaction with HRM practices. Staff productivity and EHR-integrated BSC do not, however, show a strong or statistically significant link.

**Table 3: Relationship between the integration of EHRs-BSC and patient outcomes at PGIMS Rohtak, including patient satisfaction, clinical outcomes, and safety**

	EHR-integrated BSC can lead to increased patient satisfaction	Satisfaction of HRM Practices at PGIMS Rohtak	EHR integrated BSC enhancement	Safety measure due to EHR-BSC healthcare management enhancement
EHR-integrated BSC can lead to increased patient satisfaction	1			
Satisfaction of HRM Practices at PGIMS Rohtak	.464**	1		
EHR integrated BSC enhancement	.066	.517**	1	
Safety measure due to EHR-BSC healthcare management enhancement	.116	.279*	.329**	1

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).

A **strong positive correlation** exists between the belief that EHR-integrated BSC can lead to increased patient satisfaction and satisfaction with current HRM practices ( $r = 0.464$ ,  $p < 0.01$ ).

A **moderate positive correlation** is observed between the belief that EHR-integrated BSC can enhance healthcare management and satisfaction with current HRM practices ( $r = 0.517$ ,  $p < 0.01$ ).

There is also a **moderate positive correlation** between the belief in EHR-integrated BSC improving healthcare management and the satisfaction with safety measures as a result of EHR-integrated BSC ( $r = 0.329$ ,  $p < 0.01$ ).

These findings highlight the significant relationships between EHR-integrated BSC, HRM practices, and patient satisfaction, emphasizing both strong and moderate correlations.

## Result

The study's concluding findings show that there is a somewhat favourable connection ( $r = 0.290$ ,  $p = 0.004$ ) between the idea that EHR-integrated BSC may improve healthcare management and the agreement that EHR integration with BSC is beneficial. The Alternative Hypothesis (H1), according to which there is a substantial correlation between EHR integration with BSC and HRM practices, is supported by this data.

Nevertheless, no discernible relationship was discovered between the execution of Balanced Scorecards connected with EHRs and HRM performance metrics, such as employee happiness and productivity, indicating that Hypothesis 2 is not supported.

Conversely, a number of noteworthy associations were discovered between patient outcomes and the integration of EHRs with BSC. Among these associations were those for clinical outcomes ( $r = 0.327$ ,  $p = 0.001$ ), safety ( $r = 0.400$ ,  $p < 0.001$ ), and patient satisfaction ( $r = 0.331$ ,  $p < 0.001$ ). These findings back up Hypothesis 3, showing a strong correlation between improved patient outcomes and EHR integration with BSC.

As a whole, the research indicates that EHR integration with BSC has a somewhat beneficial influence on HRM practices and a large positive impact on patient outcomes. It also partially supports Hypotheses 1 and 3. The findings, however, did not support Hypothesis 2, which proposed an influence on HRM performance metrics. These results highlight the role that EHR-BSC integration plays in improving patient outcomes and the significance of this integration for healthcare management.

## Conclusion and Discussion

The study's ultimate conclusion and discussion provide insightful information about how HRM practices, patient outcomes, healthcare management, and HRM performance indicators are affected when EHRs are linked with BSC.

The study's findings show a somewhat favourable association between the perceptions of improved healthcare management and EHR integration with BSC. This study supports the notion that EHRs and BSC may collaborate well by indicating that healthcare professionals believe that EHR-BSC integration has the potential to enhance healthcare management practices.

Nevertheless, the study did not discover a meaningful relationship between HRM performance metrics such as employee productivity and satisfaction and the use of EHR-integrated BSC. This suggests that although EHR-BSC integration may have an effect on healthcare management, these particular HRM performance metrics are not directly impacted by it. There might be a number of reasons for this lack of association, and further research is required to fully understand the dynamics of this relationship.

On the other hand, the study found many noteworthy connections between patient outcomes and EHR integration with BSC. These encompassed safety protocols, clinical results, and patient satisfaction. These results highlight the potential for EHR-BSC integration to improve patient outcomes—a critical component of healthcare. It means that in order to improve patient happiness, clinical efficacy, and safety protocols, healthcare companies should think about integrating this technology as a strategic tool.

In summary, by showing how EHR-BSC integration might enhance healthcare management procedures and more importantly patient outcomes, the study adds significant knowledge to the expanding field of healthcare management. Despite the lack of a direct influence on HRM performance measures, the study provides a strong basis for further research in this field. These results may be used by healthcare organizations, such as PGIMS Rohtak, to make well-informed decisions on the use of EHR-BSC integration to raise the standard and efficiency of treatment generally. The study highlights the value of managing healthcare systems holistically, taking into account the interactions between technology, management techniques, and patient outcomes.

## Suggestions

- Examine certain HRM practices and how they relate to the integration of the EHR-BSC.
- To evaluate long-term consequences, do longitudinal research.
- Integrate qualitative and quantitative research findings.
- Conduct integration cost-benefit evaluations.
- Prioritize effective change management techniques at the time of adoption.

### Limitations

The very small sample size of 82 replies out of an intended 100 responses is one of the study's limitations, which might restrict how broadly the results can be applied. This study's cross-sectional research methodology makes it impossible to monitor changes over time or demonstrate causation, and its dependence on self-reported data raises the possibility of bias. Furthermore, the study's exclusive emphasis on PGIMS Rohtak as a single healthcare facility may have limited the data's generalizability. The accuracy of the data may also be impacted by social desirability bias, as respondents may give responses they believe to be socially acceptable.

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