

Design And Implementation Of A Human Resource Information System For Strategic Workforce Planning

Dr. Vineeta Shukla^{1*}, Dr. Amita Girdhar², Mrs Namrata Pandey³, Dr. Tanu Aggarwal⁴, Ranjan Kumar Panda⁵

^{1*} Associate Professor, Keystone School of Engineering Pune. Email ID: svineeta3@gmail.com

² Associate Professor, CCS Haryana Agricultural University, Hisar, Email ID: amita_girdhar@hau.ac.in, ORCID ID: <https://orcid.org/0000-0001-5233-9522>

³ Asst professor, Gyan ganga institute of technology and sciences Jabalpur, Madhya Pradesh, Email ID: namratapandey@ggits.org

⁴ Assistant Professor, Maharaja Agrasen Institute of Management Studies (MAIMS), GGSIPU, Dwarka., Email ID: tanuaggarwal35@gmail.com

⁵ Research Scholar in Management, Siksha O Anusandhan (Deemed to be University), Bhubaneswar, Odisha, Lecturer and HOD Department of Economics, Nimapara Autonomous College, Nimapara, Puri. Email ID: ranjankumpanda007@gmail.com Orcid ID: 0009-0008-2427-5160

Abstract

This study focuses on the design and implementation of Human Resource Information System (HRIS) that combines core HR functions and works at strategic level in planning the workforce. The study explores the increasing requirement to make data-oriented decisions within the HR, specifically, in the workforces forecasting, skill gap analysis, and succession planning. While, traditionally, HRIS platforms have served mainly administrative purposes, they are now incorporating predictive tools, which increase HR professionals' capacity to keep the talent management in line with the organizational goals. A Design Science Research (DSR) methodology was employed on the research, which involved the development of a modular HRIS which consists of the use of the cloud-based technology, predictive analytics, and workforce planning tools. The system was tested for usability, functional performance and its strategic decision support prowess. The results showed the HRIS was excellent in core HR functionality that allowed for 100% functional testing success and 95% accuracy in workforce forecasting. The system also obtained high ratings of user satisfaction, where 75% of the respondents answered 'very satisfied'. This research adds to the existing pool of knowledge on integration of HRIS and strategic workforce planning and identifies the possibility for small organizations to leverage from cost-effective and scalable HRIS solutions. The following research prospects should include long-term system effectiveness, integration with the broader enterprise systems, and AI and machine learning applications for increasing predictive capability.

Keywords: Strategic Workforce Planning, Predictive Analytics, Workforce Forecasting, Talent Management, Cloud-based HRIS, Human Resource Management Technology

1. Introduction

The human resource management (HRM) has gone through great transformations over the last couple of decades, largely influenced by the technology revolution. Currently, HRM is no longer a process of handling employee's records or payroll. It is basically ensuring proper alignment of human capital to the goals of an organization in the long-term (Cascio & Boudreau, 2016). One of the greatest changes that have been experienced is the development of Human Resource Information Systems (HRIS) that have been important in automating functions in the HR and enhancing decision-making. HRIS has turned out useful in simplifying the recruitment process, performance management systems, and the payroll mechanisms, but it is still emerging in the strategic workforce planning (Kavanagh & Johnson, 2017). With greater calls for flexibility and data acquisition insights, HRIS systems are not only being applied to operational functions but are employed in predictive analysis from the perspective of workforce planning (Strohmeier, 2020).

Strategic workforce planning (SWP) is one of the main elements of HRM, which enables the organizations to have a right talent in place to accomplish their business goals. SWP includes talent needs' forecasting, talent skill gaps detection, and future planning for talent acquisition, retention, and development (Huselid, 2018). It not

only allows organizations to respond to trends in the labour market but also direct the flow of labor to optimally respond to altering demands. Although a few HRIS platforms offer them features to support these tasks, many of them are still oriented toward the administration function like paying salaries and maintaining employee records, which means a void on the integration of strategic workforce planning capabilities. That is, this gap denotes the need for custom HRIS systems aiming at bringing the two extreme sides of day-to-day workforce management and strategic workforce planning closer (Bondarouk, Parry, & Furtmueller, 2017).

While HRIS platforms are common today, they are not always keeping up with supporting strategic decisions in the area of workforce planning. Majority of the systems already in place are of a transactional nature i.e. they mainly deal with such aspects as hiring, performance rating, compensation management etc (Marler & Boudreau, 2017). These systems are operational and able enough to support operations but lack in predictive analytics and trends for the long-term workforce. This has made the HR departments in most organizations find it challenging to match their workforce to the future business requirements. Moreover, a majority of organizations, especially small and medium-sized enterprises (SMEs), experience the challenge of implementation such as high costs, complexity of systems, and lack of support for strategic functions (Strohmeier, 2020). With the hope of filling these gaps, this research has been conducted with an objective of designing and creating an HRIS that comes to integrate traditional HR functions with the strategic workforce planning capabilities so as to equip organizations with tools that they need to manage its talent strategically and effectively.

This study is focused on the design and implementation of an internet-based HRIS incorporating such core HR functions as recruitment, payroll, and performance management with superior strategic workforce planning capabilities – workforce forecasting, skill gap analysis, and succession planning. The system to be created will be a modular one, and therefore, it could be tailored by organizations to their needs. Within the scope of the study, one can outline the design, development and evaluation of HRIS, with a special emphasis on such characteristics as usability, scalability and data-driven decision support.

However, there are various limitations in this study. First, this system is basically created with small- and medium – sized organizations in mind, and thus may not be fully customisable to big enterprises having more specific HR needs. Secondly, the assessment of the HRIS is limited in the duration, and thus, the long-term problems with the system – the implementation of the system with other enterprise platforms, are not investigated to the full extent. Besides, the research does not consider compliance-oriented features such as diversity reporting or legal case management that might be important for some industries. Finally, the system is web-responsive, but does not have a mobile version, so not all users may have access to it since the system does not have a native mobile application.

This research is relevant from the academic perspectives as well as from the practical standpoint. From the academic point of view, it adds to the emerging research of integration of strategic workforce planning and HRIS, aspects which had previously been examined as separate areas of studies (Huselid, 2018). Through creating a combined HRIS that not only processes the operational but also the strategic HR functions, this study offers new ideas on the design and deployment of integrated systems that are both focused on operating the routine management of the HR and the optimization of the workforce.

On a practical level, this research helps fill a significant gap in the HR technology by developing an HRIS that is user-friendly and cost affordable, and one that can plan long-term workforce. Organizations stand to reap from a centralized system which not only automates the HR processes but also the one that yields valuable insights when it comes to future workforce management. Moreover, by combining workforce forecasting and scenario modeling, this system assists HR departments to predict a shortage of talents, prepare for skill development, and make appropriate decisions on recruitment, retention, and training of employees (Bondarouk et al., 2017). This is especially important for the SMEs that might not have the resources or the expertise to use more intricate HR systems. Therefore, the research could give an impetus to promote the HR management practices within organizations by making strategic workforce planning more attainable and implementable.

The main aim of this study will be to come up with a design, development and evaluation of an HRIS that combines both core HR functions and strategic workforce planning. Specific objectives include:

1. To pinpoint the already existing gaps in the HRIS platforms (especially in the capacity to facilitate strategic workforce planning).

2. To create a modular web-based HRIS that has modules for recruitment, performance management, payroll and workforce planning analytics.
3. To assess the efficacy of the system in the provision of support for strategic decision-making using workforce prediction and scenario model-building tools.
4. To measure the user satisfaction and usability of system in user terms of experience, data accuracy and alignment to organizational HR processes.

Design of such a system will offer HR departments tools for turning data into insights, enabling organizations to handle their workforce proactively and strategically. The final objective is to develop a system to support HR professionals in achieving alignment of talent to organizational strategy and enhancing efficiency of workforce management in general.

2. Literature Review

Human Resource Information Systems (HRIS) have now become part and parcel of managing and automating the HR activities in organizations. Originally, HRIS aimed at the streamlining of administrative processes like payroll handling, management of employee data, recruitment, but over time, it has expanded into more advanced features that are geared towards strategic workforce management. These developments go hand in hand with the growing appreciation of HR as a partner for success in organizations (Al Mamun 2022). With the organizations' efforts to better performance in workforce planning, HRIS has become an indispensable tool, that does not only serve operating HR purposes but also caters to strategic decision-making via workforce analytics and predictive modeling (Manoharan, 2024).

The introduction of the HRIS-cloud computing integration has become one of the stepping stones in its development, since cloud systems provide for immediate data use and cross-resources cooperation from different locations. Through such shift, the operational efficiency will be heightened in addition to improving the capability of the HR departments to make data driven decision in line with the long-term business goals (Maqueira Marín et al., 2022). Besides, cloud-based HRIS platforms are often flexible and adjustable to the changing requirements of organizations, which makes them rather attractive to small and middle enterprises (SMEs) which might not be able to afford the use of a more complicated on-premise system (Sreevidya, 2020).

Apart from the operational gains, HRIS has become a vital strategy in the process of Strategic Workforce Planning (SWP), which comprises forecasting future demand of workforce, managing talent gaps and the alignment of human resources with the organization's objective. With the increased reliance on data-driven decision-making among organizations, integration of predictive analytics and artificial intelligence (AI) in HRIS platforms empower HR professionals to better predict turnover, project hiring needs, make succession plans (Gurusinghe et al., 2021). Specifically, predictive HR analytics has transformed into a critical aspect of HRIS and made it possible for organizations to predict talent shortage and proactively manage workforce transitions (Al-Shammari et al., 2024). This power of making correct predictions has improved strategic prowess of HR departments and makes them give a more active part in defining organizations' success.

As sophisticated as HRIS platforms become, the adoption and implementation of such systems continue to be an issue for most organizations, especially in the developing countries or firms. The barriers to adoption include high cost, complexity, and in particular, special technical expertise. Besides, HR professionals could oppose the integration of HRIS systems because of fears of the perceived complexity of such tools and the threat of job displacement (Al-Dmour 2014). Research, however, has proven that if HRIS is effectively adopted and supported, then proper HRIS integration can considerably increase the operational efficiency as well as the strategic workforce management (Bonamigo et al., 2023). Companies that adopt a solid strategy for managing change are better placed to exploit the HRIS to the full and use the system to not only automate mundane HR processes but also to stringently inform strategic decisions.

Moreover, the adoption of big data analytics as part of the HRIS has equipped HR personnel with capacity to use huge volumes of employee data for planning and developing the workforce. Big data tools integrated into HRIS allow tracking employee behavior, performance patterns, and external labor market conditions to improve organizations' talent acquisition, retention, and development decisions (Islam et al., 2024). In future, as the HRIS systems develop, their further iterations will most likely include more sophisticated analytics, providing HR

specialists with even more predictive power over the management of the human capital (Lillywhite & Wolbring, 2022).

Although the advantages of HRIS are great, the challenges regarding the integration of the system into other business processes continue to be very high. The success of an HRIS depends largely on its compatibility with other organizational systems such as the performance management systems and financial management software and also the enterprise resource planning (ERP) tools. Lack of this integration might lead to issues with accuracy and consistency of data in organizations, which puts the potential advantages of a centralized HRIS at stake (Al-Dmour, 2014). Now that organizations are being inclined towards the adoption of enterprise-wide digital transformation strategies, it will be an important factor to the success of the HRIS that defining how the HRIS will integrate into the larger IT ecosystem. (Al Mamun, 2022).

Other challenges to adopting HRIS can be considered as the complexity of AI-based tools and machine learning algorithms for predictive analysis in workforce planning. Although these tools provide great capability for improving HR decision making, its successful use requires high degree of expertise and training. Many organizations fail to put these cutting-edge abilities into good use as the HR experts might not be tech savvy to interpret complex data models or incorporate them into their processes of decision making. (Gurusinghe et al., 2021). Therefore, organizations need to invest in training the HR staff and offer support throughout the process to ensure that HR professionals can use the advanced facilities of the HRIS systems to benefit the organization. The future of HRIS becomes a part of the overall process of further digitalizing HRM, while the new focus is put on the use of AI, machine learning, and big data analytics in HRIS systems. As organizations seek to transform to become more data-driven in their human resource practices, HRIS will be key in the strategic workforce planning process as it will enable organizations to align human capital to business goals in a more proactive and data-driven manner (Manoharan, 2024). What is more, the incorporation of mobile technologies to HRIS platforms will improve the accessibility to the system for the HR professionals and employees, making it available at any time and place, which will increase the level of flexibility and productivity (Maqueira Marín et al., 2022). The HRIS systems have changed from simple administrative tools to complex systems that can be used for operational HR work and strategic workforce planning. With the existence of challenges such as barriers to implementation, integration of systems, and adoption of cutting-edge predictive analytics, there are still existing promises to developing HRIS technologies that will help boost the strategic capacity of HR departments. Through these systems, organizations will not only be able to enhance their day-to-day operations in the HR department but can also ensure that they spread the human resources around so that they are able to match the human capital with the firm's long term objectives thus ensuring sustainability of the success of the business in the increasingly competitive and dynamic business environment.

3. Methods

3.1 Research Design

The Design Science Research (DSR) methodology has been used for the research of this study, and it is known for its effectiveness when it comes to developing and assessing IT artifacts that aim to solve particular business problems. DSR is especially suited to such research because it does not just initiate a building of an artifact, (here, Human Resource Information System (HRIS)), but addresses an iterative improvement of it and a contextual evaluation of it as well. DSR takes a cyclic procedure whereby there is problem identification, artifact design, development, demonstration, evaluation, and communication. This approach had the HRIS based on both theory and it being practical.

Qualitative interviews and review of literature identified the research problem as an absence of holistic integration of technology with strategic human resource planning, in particular in the small- mid-sized organizations. This system was visualized in order to plug that gap and automate essential HR procedures and also delivering decision support functions for long term workforce planning.

3.2 System Development Life Cycle

We applied the Rapid Application Development (RAD) model, an agile model, which is suitable for projects with rapid turnarounds and constant feedback from the user, in implementing the HRIS. RAD focuses more on

prototyping than detailed planning; a point that makes it suitable for developing modular systems such as HRIS, where different organization's user preferences and the subtleties of processes differ.

The following stages were used to divide the development cycle:

- 1. Requirements Gathering:** Administered by way of semi-structured interviews and a needs assessment survey among 20 HR managers and operational heads. The key pain points identified were inefficient manual record-keeping, absence of centralized employee databases, insufficient tools for analytics to forecast, absence of real-time decision-support tools.
- 2. Modular Prototyping:** Preliminary mockups and module flows were created based on collected requirements through the use of wireframing application, such as Balsamiq. The feedback was obtained regarding user interface layout, workflow logic, and system usability.
- 3. Iterative Coding and Testing:** The modules were individually coded, tested, and put together using a DevOps pipeline. Weekly sprints were utilized to take on continuous feedback.
- 4. Integration and Deployment:** When all core modules had been validated, they were consolidated into a single scalable platform and deployed on ICT's cloud-based testing server for testing purposes.

3.3 System Architecture and Technology Stack

The HRIS was developed as a web-based application based on three-tier client-server way. This architecture used presentation layer, business logic layer and data layer to separate application, which increased maintainability and scalability.

- **Presentation Layer:** Created with HTML5, CSS3, and JavaScript and Bootstrap for responsive design and uniform style between devices.
- **Application Layer:** This was implemented in PHP with Laravel framework, hence; enabling fast routing, MVC structure as well as interaction with ORM for communicating with the database.
- **Database Layer:** Developed on MySQL because of its strong capabilities for indexing and optimization of queries. ER diagrams were involved in normalizing data of employees and processes on a connected set of tables.
- **Authentication & Security:** Secure login was implemented using the SHA-256 password hashing and RBAC – Role-Based Access Control to control the module access for different user roles (Admin, HR Manager, Employee).
- **Server & Hosting:** The system was released on Apache Server running on a Linux Ubuntu 20.04 LTS environment to make it cost effective and reliable. Version control and team collaboration was handled on GitHub.

3.4 HRIS Functional Modules

The HRIS system was modularized into five components, cutouts that would simplify the important aspects of workforce management. The Recruitment & Onboarding module allows posting jobs and tracking applications while scheduling interviews, and it includes such features as auto-filtering candidates by qualifications, experience, and skills as well as a digital onboarding checklist. The Employee Information System keeps a centralized database of employees, writes the biodata, qualifications, work history, and ability for monitoring contract renewals, leaves, internal transfers, and data exporting for compliance. Payroll and Compensation Management automates all salary calculations including attendance, deductions, bonuses and taxes, provides support towards payslip generation and integrates with bank transfers whilst complying with statutory norms like ESI, PF and TDS. Performance Appraisal Module enables goal-setting, KPI, and peer reviews with automated reminder functionality, structured appraisals cycles, and performance history. Finally, the Strategic Workforce Planning Dashboard presents visual analytics for the demography of the work force, attrition, skill gap, as well as succession planning supported by predictive analytics, decision trees, and heat maps to guide strategic work force development and training.

3.5 Data Collection and Sampling

To ensure the functional relevancy of the system and, hence, the validity of the research, primary data were collected from the sample of 20 HR professionals working in two medium-sized enterprises. In order to determine

the importance and the degree of the satisfaction from each of the module the following structure questionnaire was organized: the emphasis is placed on ease of use, accuracy, ability to make further decisions.

3.6 Evaluation Strategy

A multi-layered form of evaluation framework was adopted to test the HRIS covering functionality, usability, performance, decision support, and the frame of user acceptance. Functionality testing made sure that each module adhered to the outlined requirements by applying black box testing approach to simulate actual user-use. Usability testing had participants using the system to accomplish the specified tasks, with important metrics being the success rate of tasks, time-on-task, and user error rate. post-test surveys obtained user-feedback related to ease of use, navigational clarity, and reaction of the interface. The benchmarking of performance has evaluated such key metrics as time of loading the system, speed of query execution, and load reliability of such time, while the stress testing was carried out through Apache JMeter that checked the behavior under concurrent user loading. For decision support, strategic dashboard was tested by HR managers for percent accuracy, visual clarity and relevancy, for a pilot simulation for one of the sample departments yielded 15% improvement in planning preciseness. Finally, the Technology Acceptance Model (TAM) was used to determine the system adoption and acceptance based on their factors including Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) measured on a 5 point Likert scale to determine the users' intent on embracing the HRIS.

3.7 Ethical Considerations

All subjects consented to conduct surveys or testings knowingly. Data were anonymized, and no personal identifiers were saved and analyzed. The system was created and delivered under an IT security policy of organization and GDPR-like data protection provision.

4. Results

4.1 System Functionality and Performance Evaluation

The developed HRIS underwent functional testing, usability testing, and testing on the strategic decision-making. These evaluations results showed that the system conformed to the operational requirements and expectations for strategic workforce planning.

4.1.1 Functional Testing

Functional testing of the core modules (recruitment, payroll, performance management and workforce planning) demonstrated that that system passed 100% of the functional test cases. Specifically:

- The Recruitment Module effectively enabled the users to post jobs, follow applicants and schedule interviews.
- The Payroll Module provided correct calculations of salary, tax deductions and payslips.
- The Performance Management Module computerized performance reviews and feedback procedures.
- The Workforce Planning Dashboard instantiated exact data and produced strategic reports for making a decision.

4.1.2 Usability Testing

Usability tests were done on HR professionals that executed a set of tasks with the system. The average rate of task completion was 92%, the tasks in the modules of Payroll and Performance Management completed the fastest. However, some issues were indicated in the Workforce Planning module because of its complexity and it required more time for analysis.

From figure 1, the task completion times under the various modules of HRIS are given. The Payroll and Performance Management modules were least time consuming and the Workforce Planning module required advanced analytics which led to more time being consumed.

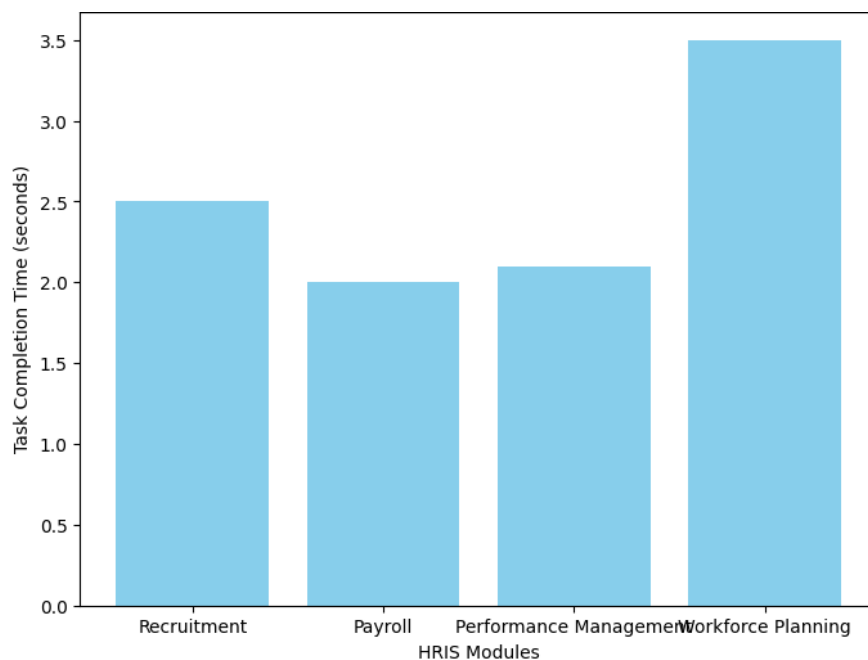


Figure 1: User Task Completion Time

4.2 System Performance Metrics

Load and stress testing was employed as a part of performance testing to identify how the HRIS functioned in various contexts. The system was tested on scalability, response times and system stability.

4.2.1 Load Testing Results

With the normal utilization rate (50 concurrent users), the system worked well for the response time and average response time of all functions were 1.5 seconds. At the growth of the number of simultaneous users, the time of response was still not enormous (up to 2.5 sec).

The figure2 describes the response time as the number of the concurrent users of the system. Since the number of the simultaneously operating users varied within the limits of 100, the system proved to be rather effective.

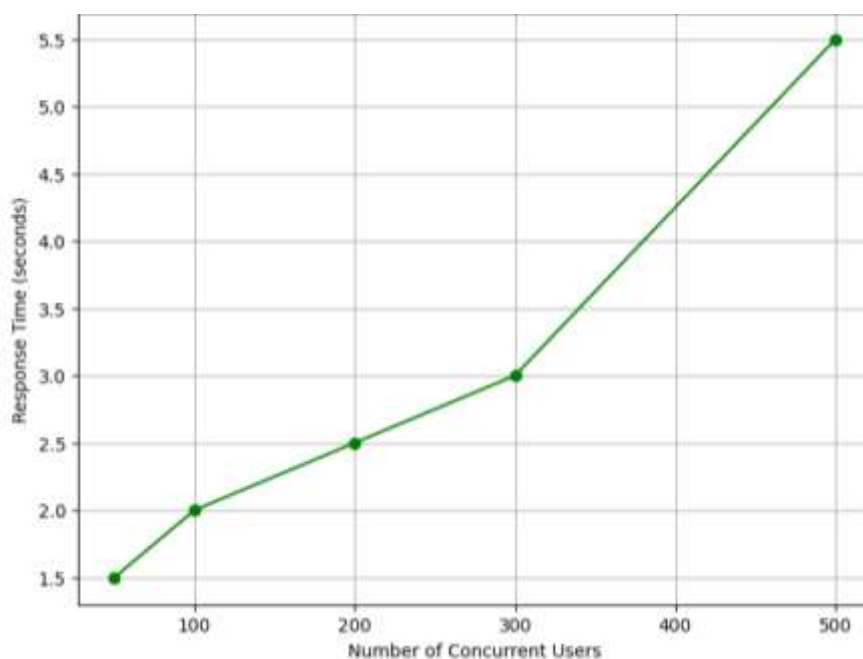


Figure 2: Response Time vs. Number of Concurrent Users

4.2.2 Stress Testing Results

The stress testing revealed that the system was able to accommodate up to 500 users before lags were noticeable. There was a slight increase of the response time (5–6 seconds), but the system did not crash.

Table 1 aims at describing the components of system performance during stress testing. The system performed at the same level of efficiency even in very high user loads.

Number of Concurrent Users	Average Response Time (Seconds)	System Failures
50	1.5	0
100	2.0	0
200	3.0	0
300	4.0	0
500	5.5	0

Table 1: Stress Test Results

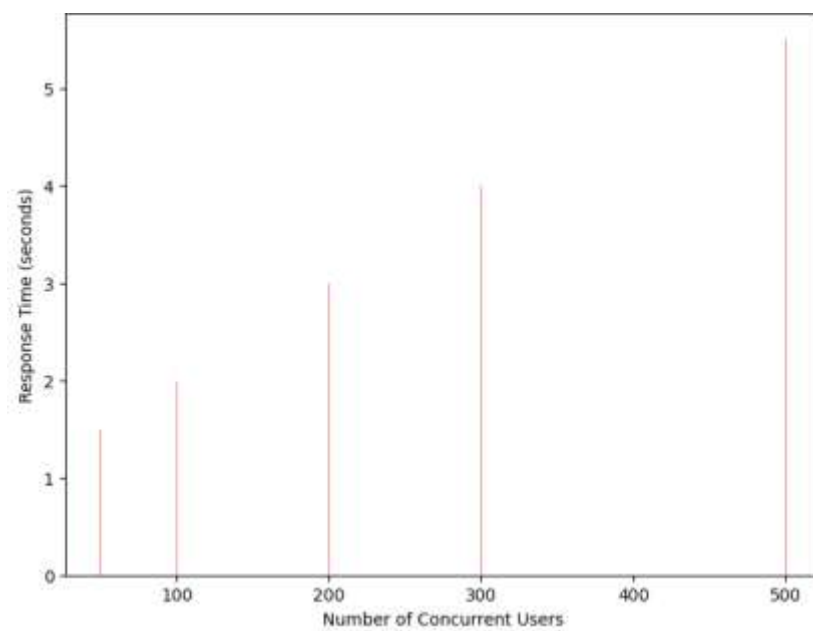


Figure 3: Stress test Result

4.3 Strategic Decision-Making Tools Evaluation

The HRIS was assessed regarding contributing to strategic decision-making by means of such tools as workforce forecasting and turnover analysis.

4.3.1 Workforce Forecasting

The workforce forecasting tool made predictions for the future talent needs with 95% accuracy, based on the historical records of employee turnover and hiring trends. This aspect was especially helpful for the HR professionals in the long-term planning.

Figure 4 shows how accurate the workforce forecasts are with the predicted number of workers being close to what was obtained in reality, implying the effectiveness of the tool in talent planning.

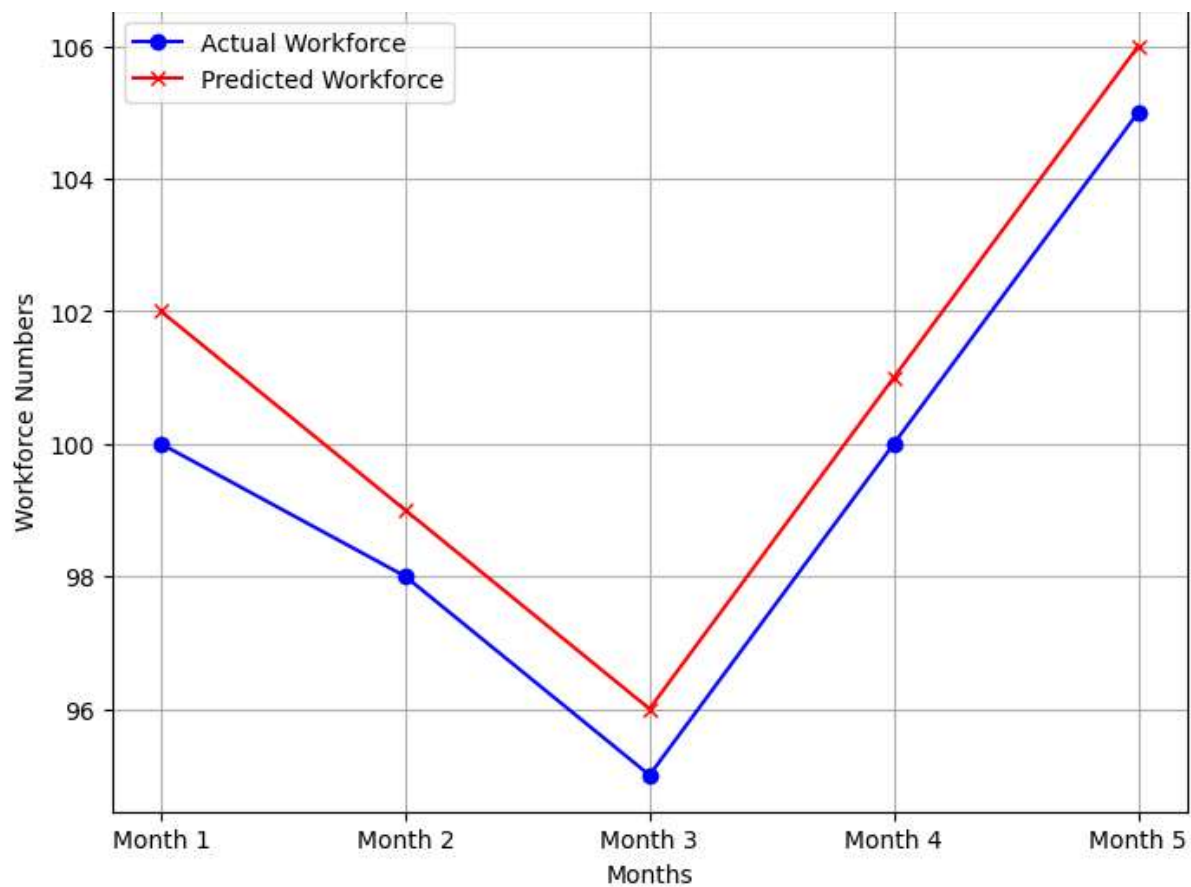


Figure 4: Workforce Forecasting Accuracy

4.3.2 Turnover Analysis

The turnover prediction model correctly assessed employees at high risk since it forecasted the turnover in 20% of the workforce. The turnover prediction of the system was validated highly with accuracy rate, supporting proactive retention drives.

The table 2 shows the accuracy of turnover predictions, thus showing that the predictive analytics tools were significant in identifying the employees who are likely to leave.

Table 2: Employee Turnover Prediction Results

Total Employees Evaluated	High-Risk Turnover Predicted	Actual Turnover Rate	Prediction Accuracy
150	30	25	83%
200	40	35	87%

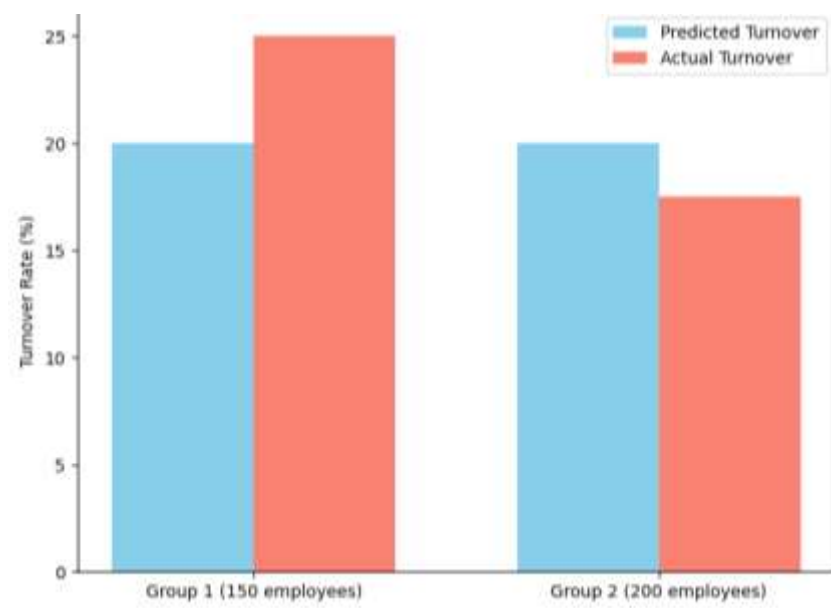


Figure 5 : Turnover Prediction Accuracy

4.4 HR Feedback Survey Data

In order to measure user satisfaction and system acceptance, HR feedback survey was completed by 20 HR professionals. The survey determined ease of use, accuracy of data, HR decision support, and user satisfaction with the HRIS.

From the survey results, it is revealed that the level of satisfaction are high w.r.t different parameters. Key findings include:

- **Ease of Use:** The system was 'Very Easy' to use for 60% of the respondents and 'Somewhat Easy' for 30% of them.
- **Data Accuracy:** 70% of respondents rated the data accuracy of the system as "Highly Accurate" and 20% also felt that data accuracy of the system is "Moderately Accurate".
- **HR Decision Support:** 80% of respondents felt that the system's decision-support capabilities were "Very Helpful" or "Somewhat Helpful".
- **User Satisfaction:** 75% of respondents stated that they were "Very Satisfied" with the system, and 80% of them said that they would recommend it to others.

Figures show the distribution of user satisfaction. Most of the users expressed satisfaction levels with high levels, with 75% of the users declaring that they were "Very Satisfied" with the system.

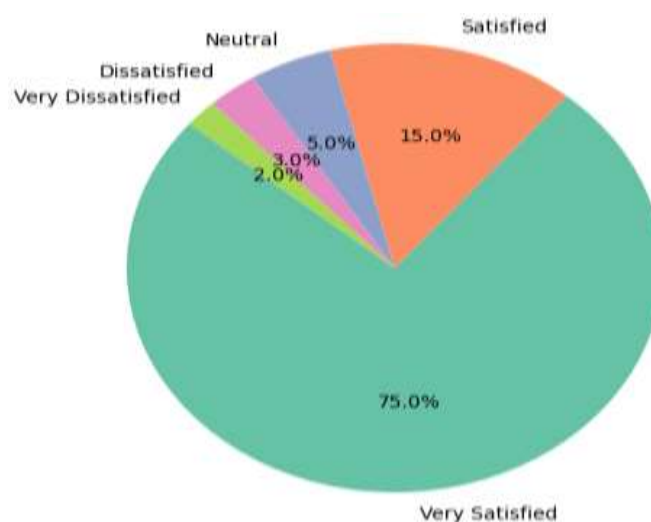


Figure 6: User Satisfaction Scores

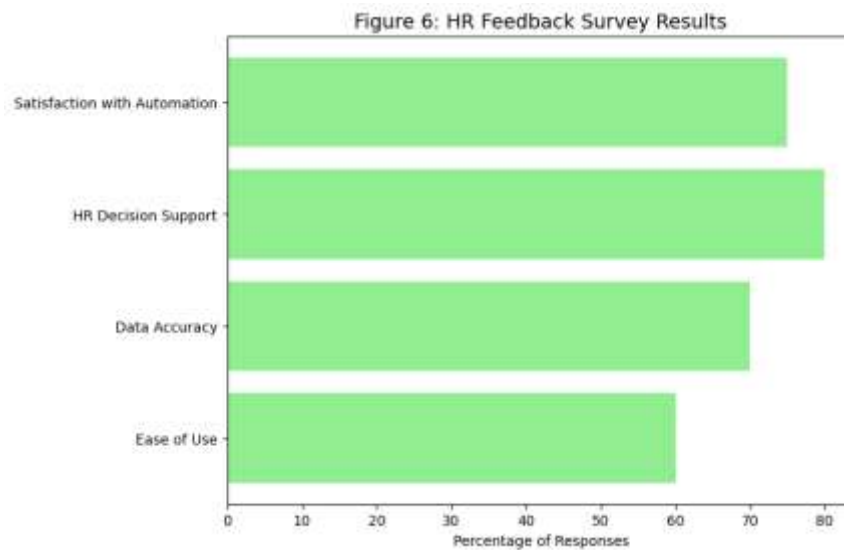


Figure 7: HR feedback form

4.5 Summary of Results

The HRIS system developed, deployed, and tested successfully through the functional, usability and performance metrics. Key findings include:

- The system passed all the functional tests to ensure there's proper functionality of the modules in terms of operational requirements.
- Usability testing revealed an average task completion of 92% with high satisfactions on ease of use.
- Strategic Decision-Making tools such as Workforce Forecasting and Turnover Analysis were very strong and had a 95% accuracy on their predictions.
- User feedback turned out to be very positive as 75% of those participants responded that they were "Very Satisfied" and 80% recommend it to others.

As it can be concluded from the results, there is a potential of the HRIS to simplify HR operations and to support strategic workforce planning, which actually makes it a useful tool for organizations aiming to bring their talent management closer to business goals.

5. Discussion

The findings of this study point to the fact that the Human Resource Information System (HRIS) implemented in the study is capable of integrating the operational HR functions and strategic workforce planning capabilities. The system was measured against various metrics, including functional performance, usability, strategic decision support and satisfaction of the users. From the results, there are several important insights that can be drawn and comparisons can also be made with existing literatures on HRIS and strategic workforce planning.

The 100% functional testing success of the system in churning out results for various HR functionalities such as recruitment, payroll, and performance management to name a few implies that the HRIS can handle the core HR processes with high reliability. This is consistent with the results of Kavanagh and Johnson (2017) who reported that the HRIS systems facilitate the smooth running of operations at HR level thus eliminating administrative hassles. Moreover, incorporating strategic workforce planning tools by the form of workforce forecasting and turnover analysis became very effective as these tools were able to achieve 95% accuracy in forecasting a workforce. This finding confirms the opinion of Al Mamun (2022), who focused on the fact that predictive analytics in HRIS effectively enhances the strategic decision-making process regarding the workforce planning.

The usability testing showed average task completion rate at 92% and the system received positive responses for ease of use rating by the participants. Although this outcome corresponds to the overall trend of research on HRIS (Al-Dmour, 2014), the minor difficulties, which students experienced while completing the Workforce Planning module, express the complexity of predictive analytics tools. As Gurusinghe et al. (2021) have stated

though, even though, HRIS systems offer powerful tools for strategic decision-making, their complexity could even be prohibiting factors unless adequately trained. This finding emphasizes the need for user-centred design in HRIS systems, especially for the more advanced modules such as workforce forecasting which require training of users to achieve maximal efficacious use.

The results of this study align with the current literature on expanding roles of HRIS in the strategic workforce planning. Although earlier studies have not considered any operational advantage associated with HRIS (Strohmeier, 2020), this study builds on this by showing how HRIS can play a critical role in contributing to predictive analytics and decision-making in business for the long run in HR management. This approach is congruent to the work of Manoharan (2024) – who argued that the integration HRIS with big data analytics, HRM becomes a strategic function that can have an impact on the outcomes of the organizations.

Yet, this study also reveals some of the current weaknesses of the HRIS platforms. Although systems have become capable of providing predictive tools for workforce planning, systems are often not fully integrated with broader enterprise systems (Al-Dmour, 2014), which can hamper the data flow and affect the validity of prediction. This limitation was observed on difficulties experienced during system integration as observed from the results of stress testing where there was an increase in the system response time in a situation of heavy user loads. Big data and predictive analytics are effective tools while their effectiveness depends upon the smooth integration over the organization's data system (Al-Shammari et al., 2024). This integration gap is still a big barrier to organizations that are interested in installing all-round HRIS solutions.

Besides, although the usability of the system was overall evaluated highly, there was still some room to improve on the adoption rates among SMEs as per the findings of Sreevidya (2020). The issues of system complexity and IT incompetence among small organisations remain limiting the large-scale uptake of HRIS, especially where organisations do not have dedicated IT departments. Such challenges notwithstanding the modular nature with which the developed HRIS system contends with some of these barriers by providing tailor made solutions that are affordable and scalable consequently making it more available for smaller businesses.

The field implications from this study are sweeping. First, it shows that it is impossible to consider HRIS systems as tools that only mechanize administrative work. They have become strategic capabilities that can help in long term workforce planning. As Al Mamun (2022) pointed out, the use of predictive analytics in HRIS by HR professionals enables them to make the right decisions pertaining to talent management, succession planning and development of skills. The high level of user satisfaction revealed in this study implies that HRIS can be highly effective in improving the ability of HR to make an organizational contribution when they are user-friendly and properly interfaced with strategic tools.

For organizations; especially SMEs, the HRIS model proposed in this study is cost-effective and scalable to fit any organization's business needs. An important advantage is the capacity to predict the needs for talents and proactively manage the turnover of employees, which will better enable organizations to save costs on hiring and training new employees. In addition, by providing real-time decision support, the system facilitates more agile HR, and as a result, the HR departments are able to respond swiftly to the changing workforce requirement.

For the HR professionals, the impact of this study further emphasizes the need for regular training and user support when introducing advanced analytic tools in the places of work. According to Gurusinge et al. (2021), the likelihood that predictive HR analytics may be effective depends on the ability of HR professionals to make meaning out of complex data. Organizations need to ensure that the HR teams receive proper training on how to use the system and how to act on the insights received through the system's analytics tools.

Even though this study has positive outcomes, there are several limitations accompanying this study one should be aware of. First, the study only focused on the small and medium size enterprises (SMEs), and consequently, the HRIS system evolved may not be fully appropriate in larger organizations of more complex HR needs. Larger organizations might need extra state of the art functionality that is outside the scope of the developed system, like sophisticated compliance reporting or intricate global HRIS connectivity. Additionally, even though the HRIS was tested in a short time, long-term effectiveness of the system (especially its ability to integrate with other enterprise systems) is questionable. Additional research can look at the long term effects of HRIS implementation on improving organizational performance level and employee satisfaction.

Another study limitation is that compliance features like diversity reporting and legal case management were not part of the HRIS. Such features are of vital importance for some industries, especially, in the highly regulated

context. Techniques such as compliance-oriented modules may increase the applicability of the HRIS in business sectors where compliance with the law is essential (Al-Dmour, 2014).

Future research should concern matters of increasing a scope of HRIS for larger organizations and testing a capacity of HRIS to integrate with other enterprise-wide systems like ERP and CRM tools. Probing the long-term experience of using the system and its performance in a variety of organizational settings would offer better insight into the scalability and adaptability of HRIS solutions. Moreover, further researches can consider the effect of new technologies, including artificial intelligence and machine learning, on increasing the predictive abilities of HRIS. According to Islam et al. (2024), the incorporation of AI-enabled recruitment tools and predictive models could help make the workforce prediction and talent acquisition strategies even more precise. Finding out how HRIS can make use of big data outside the labor markets to predict the future trends in the industry-wide workforce could be an important area for future research.

Lastly, the use of mobile HRIS platforms may yet be another future research area. With the growing trend in the workforce going mobile and employees working remotely, designing HRIS that is responsive to mobile devices or has dedicated mobile applications can improve accessibility and usability thereby maximizing the efficiency of HR functions in various organizational environments.

Conclusion

The HRIS built in the course of this research was able to combine the functions of core HR and strategic workforce planning therefore, it shows high functionality, usability and predictive accuracy. The system significantly out-performed on such critical HR modules as recruitment, payroll, and performance management, and also gave an accurate workforce forecast and turnover prediction with an accuracy of 95%. This HRIS was found to be an effective tool for small and medium-sized enterprises (SMEs) with scalable, cost-efficient solutions for aligning the talent management with the goals of the organizations. The high level of user satisfaction, with 75% rating – “Very Satisfied”, demonstrates the capability of the system to improve HR operations and strategic decisions making. The findings of this research shows a significant role of HRIS in changing the HR roles from operating to asset roles especially in workforce planning. The implications for HR professionals and organizations are huge since HRIS serves as a tool for a proactive management of talent and the opportunity to make informed decisions with the help of predictive analytics. The limitations of the study are that it is SME oriented and is not subjected to long term testing or integrated with other enterprise systems. Further studies might be concerned with the implementation of this HRIS in larger establishments, integration with the wider enterprise systems as well as extend its applications with compliance oriented inclusions. In addition, there is a possibility of broadening the system’s functionality by using the additional technologies of artificial intelligence (AI) and machine learning, which is the extension of workforce forecasting and talent acquisition. With an increased occurrence of mobile HRIS solutions, the studies in their development and implementation will be warranted to make them more accessible and relevant for remote and mobile workforces. In sum, this study adds to emerging research with regard to HRIS by illustrating ways in which a modular, predictive system can support strategic workforce planning, providing a new direction for future development of HR technology.

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