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A Study on Steps in Building Data Infrastructure for Data-Driven HR Practices in Modern Organizations (HR Analytics Perspective)

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Abstract

HR analytics is the process of gathering and analyzing HR data to yield useful insights, enhance decision-making, and energize the workplace with data accuracy. Working dimensions are changing every minute in the world with advanced insights into the work environment. As a part of the progression advanced technologies are adopted in organizations. New landscapes and horizons are made a pool of data as employees work 24/7, work from home, destination works, and various alternatives give rise to the use of the data. Now the data is new blood for the old organizations. So, in this parlance, the use of HR analytics is the need of the hour for HR Managers in developing organizations. A separate infrastructure is needed in the phase of modern organizations to become a rollercoaster in data-driven organizations. This paper focuses on the steps in creating data infrastructure for developing an infrastructure in modern organizations for data-driven HR practices.

Keywords: *HR Analytics, AI-Based HRM, Metrics, Data Driven, Data Infrastructure.*

1. INTRODUCTION:

In the past that is before HR analytics decisions were taken based on feelings, experiences, and opinions. Regarding data, HR managers rely on annual performance reports, exit interviews, and opinion surveys. These types of mechanisms have vanished in this digital era. All types of data are available in the e-contents biometric attendance, face recognition app services, and CCTV surveillance generate lots of data which helps to make decisions on performance and attendance. We can call this the pre-analytical period; HR analytics has evolved as *descriptive* and *diagnostic* analytics in the dynamic changing environment. The data relating to employee demographics, retention, and other fundamental HR metrics are descriptive analytics whereas diagnostic analytics are identifying the patterns and relationships in the data. The emergence of data-driven HR Professionals is the need of the hour for modern organizations.

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2. Research Objectives:

i. To identify the data strategies associated with the HR Metrics which are focused on HR analytics.
ii. To focus on the data infrastructure for building data-driven organizations.
iii. To know the different layers for building data infrastructure to collect, storage, and access.
iii. To examine the future trends in the HR practices in the organizations.

3. HR Analytics Analysis:

Data Strategy is key in gathering, maintaining, and processing data for the decision-makers. Some of the HR Analytics are given in the following table:

S. No	Type of HR Metric Analytics	Activities under metric
1	**Recruitment Metrics**	Cost per Hire Time to Hire Acceptance rate New hire turnover Time to Productivity
2	**Performance Metrics**	Employee performance Performance and potential Goal tracking Capability analytics Capacity analytics Leadership performance
3	**Employee retention and Satisfaction Metrics**	Employee Engagement Score Retention Rate Turnover rate/employee churn Absenteeism
4	**Training and Development Metrics**	Cost of training per employee Training Effectiveness Training completion rate Time to completion Time since last promotion

4. Review of Literature:

Ref. No	Study Purpose	Methodology	Key Findings
[1]	Develop AI-based HRM system for decision making	Algorithm development and data mining	AI aids efficient decision-making through data analysis in HRM
[2]	Examine resources needed for AI capability in HRM	Systematic review, AI capability framework	Technical and non-technical resources required for successful AI adoption in HRM
[3]	Propose an ethical framework for managing AI in HRM	Narrative review, ethical principles	The multi-stakeholder ethical framework developed to guide AI-augmented HRM
[4]	Design AI-based HRM system with decision modules	AI-based HRM system design, Back Propagation, Neural Network	AI-based HRM system aids in efficient decision-making
[5]	Develop a coherent framework for AI-augmented HRM	TOP framework, innovation assimilation theory	AI-augmented HRM holds operational, relational, and transformational benefits, affected by various factors.

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5. Creating the Data Infrastructure for HR Analytics:

The first activity for building the data infrastructure is to ensure the need for an HR Tech/ IT strategy that fits the company's central strategy. For this process, HR professionals have to be clear in the setting up of HR strategic goals in the line of organization technology strategy.

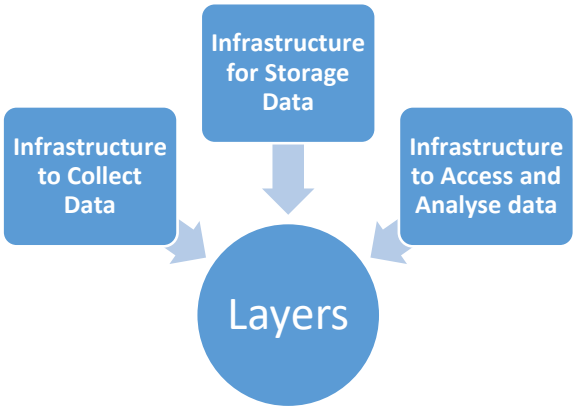
1. **Creating Technology Strategy**: This step involves several activities namely

i. Conforming the HR Functional Goals
ii. Looking at the current HR Technologies
iii. Asses for the future requirements
iv. Identify the technological gap
v. Categorize the data and AI requirements.

2. **Ensuring Technology Strategy Stays Sprightly:** It is mandatory to review the strategy that meets the requirements and changes that are coming in the business world. After that keep up to date about the HR software and hardware requirements.
3. **Practical Implication of AI Infrastructure:** It is hard to work with the wide implication of data from the recruitment, selection, placement, attendance, training, performance evaluation, and so on, for this huge cost has to be incurred for the software, hardware, storage devices, and team of data analysts.

6. Infrastructure

Layers to build technology infrastructure:



1. **Infrastructure to Collect Data:** In this step, organizations have to focus on how to get the data from internal and external sources, and plan data into structured sources for collecting and processing data for decision-making. Structured data such as employee feedback, recruitment channels, social media channels, sensors (wearable and machine), or any other sources. The organizations have to invest money in the collection of data. The sources of collecting data are:

- Sensors
- Fitted devices, Machines, Buildings, Vehicles, Packaging, Employee badges, or anything else that wants to capture data from
- CCTVs and Videos
- Website Cookies
- Employee feedback/reviews
- Employee communication system
- Social Media Feeds

2. **Infrastructure for Storage Data:** After identifying the data capture needs the next step is to identify where to store the collected data before analyzing. In this layer companies have to focus on the traditional storage sources, on-premises data warehouses, and cloud-based systems. The main choices between traditional and modern systems.

i. On-site Storage options: As far as on-premises storage solutions go, regular *hard disks* of very high capacity are available these days at low prices, by enterprise IT standards. Other storage options include *solid-state storage solutions and* old-fashioned magnetic tape. This helps store limited data that is accessed very frequently.

ii. Cloud storage: These days cloud-based services are moving very fast, cloud-based storage facilities have certain advantages that are on

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behalf of the company the third party is maintaining data this process makes the company from storing data third-party servers helpful to store data and access data this type creates big data sets.

iii. **Public, Private, and Hybrid Clouds:** *Public cloud* generally refers to cloud services provided by a third-party organization that specializes in doing so. The data itself is not usually public – rather, 'public' refers to the fact that the third-party organization provides cloud computing services to customers (either individuals or businesses) and anyone can use them. The biggest public cloud providers at the moment are:
   - Amazon Web Services
   - Microsoft Azure
   - Google Cloud Services
   - Alibaba Cloud
   - IBM

Private cloud is simply a term for what companies do today when they maintain everything in-house but follow similar models of deployment, access management, and infrastructure maintenance as the public cloud providers. A company that outsources all of its data and computing requirements to another organization – one that does not also offer the same services publicly – could also be considered to be operating a private cloud infrastructure. The primary reason for doing this is often security – in some cases, businesses will be working with data that is so sensitive that it isn't permission for storage outside of the organization's immediate jurisdiction.

A hybrid cloud usually refers to a solution comprising public and private cloud elements. This can be useful when, for example, a subset of the data you are using is too sensitive to let out of your hands, but other data is safe to host publicly, where you can take advantage of the infrastructure that public providers make available. This creates a very agile environment where the best elements of each ecosystem are on hand, as and when they are needed. A challenge is that software needs to be able to communicate across public and private servers, even if it can't access the same data on each one, but this is generally catered for by the big providers of hybrid cloud services.

Private Cloud	Pubic Cloud	Hybrid Cloud
Business Operates the Cloud	Operated by third Party	Combination of both private and public environments.
Merits		
Fully Customized, High-level security, Superior Performance	No Capital Cost, Low IT Overheads, Infinite Scalability	Flexible, No ceiling for Capacity, fewer IT overheads, Manageable security.
Demerits		
Capital Cost, Under Utilization, High IT Overheads.	Customization problem, Governance issues.	Compatibility

3. Infrastructure to Access and Analyse data

Finally, consider the process and analyze the data that was collected and stored to extract the required insights.

The process of extracting insights from data can be distilled into three steps:

- Preparing the data – identifying, cleaning, and formatting it so it can be analyzed efficiently
- Building the analytics model
- Concluding the result of the analytics

This layer is really where AI comes into its own because many of the advanced analytics options on the market are built on machine learning. But before you invest in infrastructure or an 'off the shelf' AI analytics service, do remember to look at the systems already in place in the organization. In other words, while there are plenty of HR-specific analytics tools on offer, want to make sure the chosen option fits with the business's wider strategy.

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7. Future trends that will shape HR

The next 10 years will see yet more transformation, both for HR and for business as a whole – and this transformation will be driven by AI, digitization, and automation. As such, the HR functions of the future are likely to be radically different as we see new technologies emerge. And as the technology evolves, so too will society. As a result, what we regard as workplace norms will also evolve.

- Radically altered job roles
- Decentralized and total remote work structures
- Fully integrated AI systems
- Demand for holistic employee experience

8. Conclusion: Employee expectations have evolved over the last decade. People – especially (but not exclusively) younger workers – increasingly expect their employer to be diverse and inclusive, to provide flexible working opportunities, and to treat them as individuals rather than just cogs in the machine. They expect to feel connected to the organization's wider purpose and values. They want to feel enriched by their work. As employee expectations continue to evolve over the next decade, employees may demand a more holistic work experience that balances their personal and professional lives. HR will therefore need to build frameworks that support this balance. As such, the importance of employee wellness programs will likely continue to grow. With advancements in healthcare technology and wearable devices, HR could provide highly personalized wellness programs that track both physical and mental health – potentially even integrating genomic data to provide personalized health plans. An opportunity to use data and AI to add value and create a workplace that creates future-ready employees with an AI-enabled HR department.

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