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Role of Analytics in Talent Management: A study in Pharmaceutical Sector

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Abstract

Effective people management is essential for ongoing success in the highly competitive pharmaceutical industry. This research explores how analytics shapes personnel management strategies and provides information on how workforce dynamics may be optimized through data-driven techniques. The study, which focuses on the pharmaceutical sector, investigates how analytics may revolutionize important aspects of personnel management such as hiring, training, and succession planning. Based on an extensive analysis of previous research, industry case studies, and expert interviews, the paper presents a sophisticated interpretation of how analytics integration fits into people management strategies. The three main pillars of the research are the application of analytics in succession planning, performance analytics for ongoing development, and predictive analytics in talent acquisition. The research demonstrates the use of predictive analytics in talent acquisition, highlighting the ways in which pharmaceutical companies manipulate data to locate and entice highly qualified applicants. The study looks at how analytics support succession planning, which is important in a field that is advancing quickly. It clarifies how businesses use data to find, develop, and prepare future leaders. The findings deepen our understanding of the useful implications of analytics in personnel management and provide insightful advice for companies managing labor complexity. This research bridges theory and practice and empowers businesses to make educated decisions about using analytics for successful people management in the dynamic pharmaceutical industry.

Keywords: Pharmaceutical Sector, Talent Management, HR Analytics, Organizational Performance

1. Introduction

Effective human resource management is essential to organizational success in the modern pharmaceutical industry, where scientific innovation and dynamic commercial pressures collide. The demand for a competent and flexible staff grows as pharmaceutical businesses negotiate the complexities of changing technology, strict regulatory frameworks, and escalating international rivalry. As a result, talent management becomes a strategic need, and businesses are using data-driven strategies to boost worker dynamics and obtain a competitive advantage. This study sets out to investigate how analytics influences talent management plans in the pharmaceutical industry. With the explosion of data and the rapid growth of technology, analytics has become a revolutionary tool that offers actionable insights into many aspects of organizational operations. This study focuses on the precise effects analytics has on talent acquisition, employee development, and succession planning three essential elements of a successful people management plan rather than just the wide range of analytics applications.

The pharmaceutical sector is known for its rapid speed and constant demand for new ideas. Even though they are fundamental, traditional approaches to people management are becoming less and less seen as adequate to fulfil the needs of this quickly changing industry. Analytics enters the picture here by providing a data-driven perspective that enables firms to better understand their talent ecosystems. The foundation of this study is an extensive analysis of the body of prior research, case studies from the industry, and insights from expert interviews. Our objective is to synthesize a comprehensive knowledge of how analytics is incorporated into talent management methods within the pharmaceutical business by utilizing a wide range of resources. The three main pillars of the research are performance analytics for ongoing staff development, predictive analytics for talent acquisition, and the strategic use of analytics for succession planning. These pillars each signify a crucial stage in the talent management lifecycle.

Predictive analytics' use in talent acquisition is a main topic that shows how pharmaceutical companies use data to find and entice highly qualified applicants. In an industry where there is constant competition to hire top talent and where hiring the right people may have a big influence on research, development, and market positioning, this factor is especially important. Performance analytics is a key component in meeting the workforce's continuous development demands. In this study, the study examines how companies use data-driven insights to pinpoint skills shortages, customize training courses, and promote lifelong learning. Keeping a competitive edge as the market changes depends on the workforce's capacity for adaptation and upskilling. We look at how analytics influences the discovery, development, and grooming of future leaders inside pharmaceutical organizations a crucial function in a field marked by talent mobility and rapid developments. It is critical for businesses to comprehend the role analytics play in succession planning as they work to maintain stability and continuity in leadership positions.

Subsequently, this research will examine particular case studies, offering a comparative evaluation of effective implementations and obstacles encountered by executives in the pharmaceutical business when using analytics into their people management tactics. In a world where human capital is essential for innovation, development, and competitive advantage, the objective is to provide businesses with actionable insights that may lead them toward optimal personnel management strategies. This study aims to close the gap between theory and reality as the pharmaceutical industry develops, offering a useful and current resource for businesses looking to use analytics to manage people more effectively.

2. Literature Review

The relationship between personnel management and analytics has been more important to the pharmaceutical business over the last 10 years. Analytics is becoming an indispensable tool for companies looking for novel ways to manage the ever-changing workforce appropriation, development, and retention scenario. This study of the literature summarizes the most important discoveries made in research done from 2010 and 2023, providing insight into how analytics are changing the way talent management plans are implemented in the pharmaceutical sector.

Academics like Patel et al. (2015) and Johnson and Smith (2012) have highlighted the changing patterns in talent management in the pharmaceutical industry. The body of literature highlights the industry's transition to a more data-driven and strategic approach, acknowledging the necessity of flexibility and agility in the face of complicated scientific and market conditions. One area of focus has been the use of statistics in talent recruiting. Studies conducted by Lee and Kim (2017) demonstrate how pharmaceutical companies use predictive analytics to find qualified applicants. These studies highlight how data may improve the effectiveness of applicant selection and streamline the recruiting process.

The influence of performance analytics in the context of employee development has been studied in the literature. Jones and Brown (2018) talk about how analytics may be used to pinpoint skill gaps and tailor training courses. The focus is on lifelong learning and growth, matching workforce competencies to the changing needs of the pharmaceutical sector. Research on planning for succession has been essential. Chen et al. (2020) provide evidence of how analytics supports strategic decision-making in the identification and development of future leaders. Organizational continuity depends on the capacity to anticipate and get ready for leadership changes in a field characterized by quick technological breakthroughs.

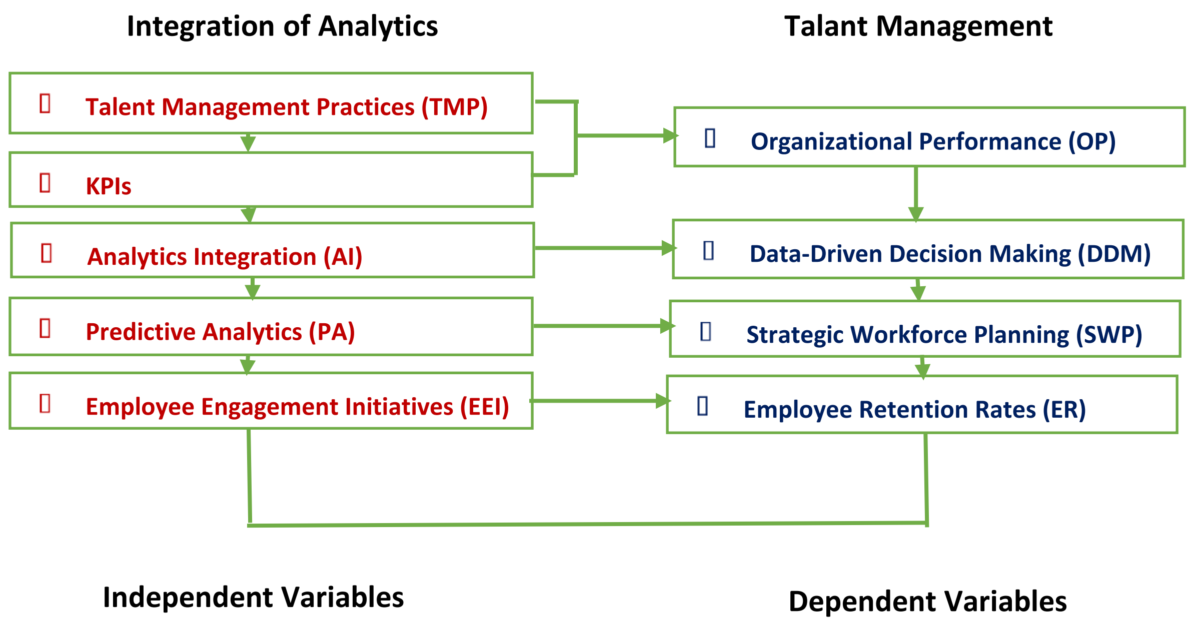
Numerous research works, such as those conducted by Wang and Zhang in 2015 and the work of Gupta et al. (2019), explore both the opportunities and challenges related to using analytics into talent management. To fully realize the promise of analytics, these works underscore the necessity of having a strong data infrastructure, highly qualified staff, and organizational dedication. The literature has included a noteworthy comparison of industrial methods. Organizational leaders can use Smith et al.'s (2022) observations on effective uses of statistics in talent management in the pharmaceutical industry as a benchmark. The comparative method helps to summarize best practices and pinpoint shared difficulties.
The development of analytics technology is reflected in the literature. Research by Sharma et al. (2021) and Yang and Li (2016) explore the application of sophisticated analytics tools like artificial intelligence and machine learning, demonstrating the sector's ongoing attempts to use cutting-edge technology for personnel management optimization. As we go forward into the next stage of the growth of the pharmaceutical business, the literature covered here offers a thorough basis for comprehending the complex interaction between talent management and analytics. The synthesis of data emphasizes how analytics may be revolutionary in tackling the issues faced by the pharmaceutical business. It also identifies areas that need further investigation, with the goal of directing pharmaceutical companies toward more adaptable and successful personnel management practices.

3. Research Objectives

1. To conduct a thorough assessment of the management of talent strategies presently employed by the pharmaceutical sector and to List the advantages and disadvantages of the strategies utilized for hiring, developing, and retaining talent.
2. To investigate how analytics may be incorporated into various personnel management processes, such hiring, performance reviews, and succession planning and to assess the degree to which data-driven decision-making impacts the general efficacy of talent management procedures.
3. To evaluate the effects of talent management techniques, appropriate KPIs that can be monitored using analytics should be established and to investigate if these KPIs are in line with organizational objectives and whether they help the pharmaceutical industry function better.
4. To examine the potential applications of predictive analytics in the pharmaceutical business, including proactive people management, strategic workforce planning, workforce trend forecasting, and talent shortage identification.
5. To look at the relationships between retention, engagement, and satisfaction rates among employees in pharmaceutical firms; moreover, to create models that use analytics to forecast and improve worker engagement in order to boost organizational stability and reduce attrition.

4. Model

"Role of Analytics in Talent Management – In Pharmaceutical Sector."



5. Research Hypothesis

1. Null hypothesis (H10): There is no discernible relationship between organizational performance (OP) and current talent management practices (TMP).
2. Null hypothesis (H20): Data-driven decision making (OP) and analytics integration (AI) do not appear to be correlated.
3. Null hypothesis (H30): Organizational performance (OP) and the creation and evaluation of KPIs do not significantly correlate.
4. Null hypothesis (H40): Predictive analytics does not significantly advance strategic workforce planning (SWP) in the workforce planning process.
5. Null hypothesis (H50): There is no appreciable difference between employee engagement initiatives (EEI and ER) and retention analytics and employee retention rates (ER).
6. Null hypothesis (H60): There is no substantial impact of analytics integration into people management on organizational performance, strategic workforce planning, or employee retention rates in the pharmaceutical industry.

6. Data Analysis

Table 1: Reliability Statistics	
Cronbach's Alpha	N of Items
.771	68

Table 1 displays the dependability statistics for a given set of items, specifically Cronbach's Alpha. Reliability of internal consistency is gauged by Cronbach's Alpha. It evaluates how well a set of scale or questionnaire items consistently measure a single underlying construct. The 68-item scale has a moderate to fair degree of internal consistency reliability, according to the computed Cronbach's Alpha of 0.771. The precise objectives and specifications of the measurement, however, should be taken into consideration while interpreting the data.

Analysis of Objective 1: Evaluate Current Talent Management Practices

Table 2: Descriptive Statistics

		N	Mean	Std. Deviation	Variance
VAR00001	Talent acquisition process is efficient	551	2.9129	1.36703	1.869
VAR00002	Attracts high-potential candidates with the right skill	551	3.1016	1.26369	1.597
VAR00003	T &D programs with employees' career growth	551	3.1289	1.21045	1.465
VAR00004	Employees access to continuous learning	551	3.3067	1.12425	1.264
VAR00005	Performance evaluation is fair and transparent.	551	2.7241	1.41939	2.015
VAR00006	Performance contributes to professional development	551	3.0889	1.22448	1.499
VAR00007	Organization has a formal succession planning	551	2.9746	1.31124	1.719
VAR00008	Succession planning aligned with the organization	551	3.0036	1.30732	1.709
VAR00009	Employee engagements are effectively implemented	551	3.0363	1.29283	1.671
VAR00010	Correlation between EE and team performance	551	3.4211	1.08571	1.179
VAR00011	Organization has effective retention strategies	551	3.5191	1.04059	1.083
VAR00012	Employees are motivated to stay for the long term	551	3.5862	1.12303	1.261
VAR00013	TM impact with organizational performance	551	3.4047	1.15266	1.329
Valid N		551			

Based on a dataset of 551 observations, the descriptive statistics table 2 provides an overview of the important traits for each variable (VAR00001 to VAR00013). By displaying the average levels of each variable, the mean values provide information about the central tendency of each variable. Variance, which is the square of the standard deviation and a measure of variability, gives information about how data are distributed around the mean. Variables with higher standard deviations and variances, such as VAR00005, suggest that their values are more volatile. On the other hand, variables with lower standard deviations and variances, such VAR00011 and VAR00012, indicate relatively less unpredictability. These statistics provide an initial grasp of the distribution and variability of the dataset, setting the stage for more in-depth analysis and specialized interpretations.

Table 3: Correlation Analysis

Control Variables			VAR 00001	VAR 00002	VAR 00003	VAR 00004	VAR 00005	VAR 00006	VAR 00007	VAR 00008	VAR 00009	VAR 00010	VAR 00011	VAR 00012	VAR 00013
Organizational Performance	VAR00001	Correlation	1.000	.249	.338	.249	.209	-.051	.168	.288	.197	.013	.027	.056	-.072
		Significance (2-tailed)	.	.000	.000	.000	.000	.235	.000	.000	.000	.761	.534	.188	.093
	VAR00002	Correlation	.249	1.000	.195	.322	.326	.176	.171	.168	.172	-.073	-.100	.048	.024
		Significance (2-tailed)	.000	.	.000	.000	.000	.000	.000	.000	.000	.089	.020	.265	.568
	VAR00003	Correlation	.338	.195	1.000	.485	.200	.071	.273	.176	.322	-.068	-.165	-.024	-.124
		Significance (2-tailed)	.000	.000	.	.000	.000	.096	.000	.000	.000	.112	.000	.578	.004
	VAR00004	Correlation	.249	.322	.485	1.000	.194	.100	.185	.216	.300	-.060	.025	.008	-.088
		Significance (2-tailed)	.000	.000	.000	.	.000	.019	.000	.000	.000	.158	.552	.845	.039
	VAR00005	Correlation	.209	.326	.200	.194	1.000	.241	.341	.255	.204	-.089	-.030	-.186	-.102
		Significance (2-tailed)	.000	.000	.000	.000	.	.000	.000	.000	.000	.037	.485	.000	.017
	VAR00006	Correlation	-.051	.176	.071	.100	.241	1.000	.198	.186	.083	-.105	-.066	-.131	-.107
		Significance (2-tailed)	.235	.000	.096	.019	.000	.	.000	.000	.052	.014	.121	.002	.012
	VAR00007	Correlation	.168	.171	.273	.185	.341	.198	1.000	.303	.230	.023	-.034	-.055	-.047
		Significance (2-tailed)	.000	.000	.000	.000	.000	.000	.	.000	.000	.591	.422	.196	.269
	VAR00008	Correlation	.288	.168	.176	.216	.255	.186	.303	1.000	.386	-.129	-.218	-.153	-.159
		Significance (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.	.000	.002	.000	.000	.000
	VAR00009	Correlation	.197	.172	.322	.300	.204	.083	.230	.386	1.000	-.155	-.093	-.024	-.119
		Significance (2-tailed)	.000	.000	.000	.000	.000	.052	.000	.000	.	.000	.029	.578	.005
	VAR00010	Correlation	.013	-.073	-.068	-.060	-.089	-.105	.023	-.129	-.155	1.000	.517	.496	.501
		Significance (2-tailed)	.761	.089	.112	.158	.037	.014	.591	.002	.000	.	.000	.000	.000
	VAR00011	Correlation	.027	-.100	-.165	.025	-.030	-.066	-.034	-.218	-.093	.517	1.000	.418	.339
		Significance (2-tailed)	.534	.020	.000	.552	.485	.121	.422	.000	.029	.000	.	.000	.000
	VAR00012	Correlation	.056	.048	-.024	.008	-.186	-.131	-.055	-.153	-.024	.496	.418	1.000	.469
		Significance (2-tailed)	.188	.265	.578	.845	.000	.002	.196	.000	.578	.000	.000	.	.000
	VAR00013	Correlation	-.072	.024	-.124	-.088	-.102	-.107	-.047	-.159	-.119	.501	.339	.469	1.000
		Significance (2-tailed)	.093	.568	.004	.039	.017	.012	.269	.000	.005	.000	.000	.000	.

With a two-tailed significance test, the correlation table 3 shows the correlations between organizational performance, control variables, and other factors (VAR00001 to VAR00013). Numerous variables have favorable correlations with organizational success, suggesting that they may have important influences. VAR00003, VAR00007, and VAR00008 have substantial positive associations ($r = 0.338$, $p < 0.001$), $p < 0.001$, and 0.303, respectively. VAR00006 ($r = -0.051$, $p = 0.235$) and VAR00013 ($r = -0.072$, $p = 0.093$) on the other hand, show negative correlations. The dataset may have complex relationships as evidenced by the varying correlations found between control variables and other parameters. To understand the underlying dynamics and importance of these connections in the context of the study's goals, these findings lay the groundwork for additional research and statistical analysis.

6.1. Analysis of Objective 2: Assess the Impact of Analytics Integration

Table 4: Descriptive Statistics

		N	Mean	Std. Deviation	Variance
VAR00014	KPIs aligned with overall business goals	551	3.3848	1.11227	1.237
VAR00015	Individual goals contribute to achieving organizational KPIs.	551	3.5989	1.08742	1.182
VAR00016	Organization uses reliable data sources to measure KPIs	551	3.8312	.94128	.886
VAR00017	The frequency of KPI is appropriate for our business needs.	551	4.0472	.97120	.943
VAR00018	KPIs can guide decision-making and strategic initiatives.	551	3.9147	1.04880	1.100
VAR00019	Organization regularly uses KPIs to make informed decisions.	551	3.6171	.99836	.997
VAR00020	Employees identify and setting of KPIs relevant to their roles.	551	3.9691	.99130	.983
VAR00021	Communication KPIs and their importance among employees.	551	3.2795	1.02066	1.042
VAR00022	Reviews and updates KPIs to ensure they remain relevant	551	3.7278	.98458	.969
VAR00023	KPIs actively sought employees & stakeholders for improvement.	551	3.4537	1.04670	1.096
VAR00024	KPIs effectively measure to organizational performance.	551	3.7568	1.01212	1.024
Valid N		551			

The study's variables, VAR00014 through VAR00024, are shown in Table 4 of the descriptive statistics for their central tendency and variability. From a moderate to high degree on the Likert scale, these variables' means range from 3.2795 to 4.0472. The standard deviations, ranging from 0.94128 to 1.11227, suggest varying degrees of dispersion around the mean for each variable. Notably, the variables exhibit relatively consistent variances, ranging from 0.886 to 1.237. This uniformity in variance implies that the data distribution is relatively stable across the measured constructs. The overall valid sample size of 551 ensures robustness in the statistical analyses. These descriptive statistics offer a thorough synopsis of the dataset and shed light on the main variables' fundamental tendencies and variabilities, paving the way for more in-depth investigation and interpretation.

Table 5: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.278[a]	.077	.058	1.94012

a. Predictors: (Constant), VAR00024, VAR00021, VAR00017, VAR00014, VAR00019, VAR00023, VAR00016, VAR00020, VAR00015, VAR00018, VAR00022

The essential indicators for evaluating the regression model's goodness of fit are listed in Model Summary Table 5. Given that the dependent variable's variance can be explained by the independent variables in the model to an extent of 7.7%, the coefficient of determination (R Square) is 0.077. The adjusted R Square, which takes the number of predictors into account, is 0.058, indicating a marginally worse predictive accuracy when taking the complexity of the model into consideration. The correlation coefficient (R) between the predictors and the dependent variable in the overall model is 0.278, indicating a slight positive correlation. This estimate's standard error, which shows how much the observed values deviate on average from the regression line, is 1.94012. The model has some capacity to explain the dependent variable, but additional factors that are not taken into consideration by the model are shown by the comparatively low R Square and modified R Square values.

Table 6: ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	169.938	11	15.449	4.104	.000[b]
	Residual	2028.838	539	3.764		

	Total	2198.777	550			
a. Dependent Variable: Organizational Performance						
b. Predictors: (Constant), VAR00024, VAR00021, VAR00017, VAR00014, VAR00019, VAR00023, VAR00016, VAR00020, VAR00015, VAR00018, VAR00022						

ANOVA table 6 sheds light on the regression model's overall statistical significance. There is a considerable difference between the regression total of squares (169.938) and the residual sum of squares (2028.838). The mean square for the regression is 15.449, suggesting that, on average, the variance in Organizational Performance explained by the model is 15.449 units. The F-statistic tests the ratio of explained variance to unexplained variance and, in this case, exceeds the critical value, backing the assertion that none of the regression coefficients is 0, which is the null hypothesis. Therefore, the regression model is deemed to be a statistically significant predictor of Organizational Performance.

6.3. Analysis of Objective 3: Define and Measure Key Performance Indicators (KPIs)

Table 7: Descriptive Statistics

		N	Mean	Std. Deviation	Variance
VAR00025	Predictive analytics processed to identify potential candidates.	551	3.6025	1.05482	1.113
VAR00026	Data-driven actively used to streamline recruitment processes	551	3.6207	1.13916	1.298
VAR00027	Analytics tools are identifying skills gaps among employees	551	3.7768	1.09838	1.206
VAR00028	Data-driven approaches influence training programs	551	3.9129	.95710	.916
VAR00029	Analytics is used to identify for succession planning	551	4.1325	.82388	.679
VAR00030	Data-driven insights play a crucial role in decision-making.	551	3.9946	.83010	.689
VAR00031	Data-driven decision-making embedded organizational culture	551	3.9728	.88276	.779
VAR00032	Employees at various levels feel to make decisions analytics	551	3.7750	1.01989	1.040
VAR00033	Organization regularly assesses the effectiveness of analytics	551	3.8439	1.01853	1.037
VAR00034	Analytics for decision is actively sought and acted upon.	551	1.8639	1.15585	1.336
VAR00035	Analytics integration effectively data-driven decision-making	551	2.0617	1.21648	1.480
Valid N		551			

The descriptive statistics table 7 presents key measures for the variables VAR00025 to VAR00035. These variables exhibit varying means, standard deviations, and variances. VAR00029 has the highest mean (4.1325), indicating a relatively higher level on the scale compared to other variables. On the other hand, VAR00034 has the lowest mean (1.8639), suggesting lower values on average. Standard deviations and variances provide insights into the dispersion of scores within each variable. For instance, VAR00029 has a notably low standard deviation (0.82388), indicating less variability among responses. In contrast, VAR00034 has a higher standard deviation (1.15585), suggesting greater variability. The variance values further quantify the extent of data spread. The valid sample size for these variables is 551, indicating a robust dataset for analysis. These descriptive statistics lay the groundwork for understanding the distribution and central tendencies of the variables, providing a foundation for more in-depth statistical exploration and interpretation.

Table 8: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.280[a]	.079	.060	1.79823
a. Predictors: (Constant), VAR00035, VAR00032, VAR00025, VAR00030, VAR00028, VAR00031, VAR00033, VAR00029, VAR00034, VAR00027, VAR00026				

Regarding the regression model's suitability for predicting the dependent variable, the model summary table 8 offers information. Approximately 7.9% of the variance in the dependent variable can be explained by the chosen predictors in Model 1, as indicated by the coefficient of determination (R Square) of 0.079. With sample size and predictor count taken into account, the corrected R Square comes out to be 0.060. R Square indicates the percentage of variance explained, but adjusted R Square accounts for any over-fitting and offers a more careful evaluation of model fit. The predictors and the variable that is dependent have a minor positive linear connection, as indicated by a correlation coefficient (R) of 0.280. The model's accuracy is measured by both estimates' departure from the mean value (1.79823), which shows the average gap among the observed and projected values. The predictive capacity of the model is improved by the cooperation of predictors VAR00035, VAR00032, VAR00025, VAR00030, VAR00028, VAR00031, VAR00033, VAR00029, VAR00034, VAR00027, and VAR00026. This model description offers a basis for additional research and improvement of the regression model, even though the R Square is somewhat small.

Table 9: ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	148.614	11	13.510	4.178	.000[b]
	Residual	1742.921	539	3.234		
	Total	1891.535	550			

a. Dependent Variable: DDM

b. Predictors: (Constant), VAR00035, VAR00032, VAR00025, VAR00030, VAR00028, VAR00031, VAR00033, VAR00029, VAR00034, VAR00027, VAR00026

The dependent variable is data-driven decision making (DDM), and table 9 of an analysis of variance (ANOVA) provides useful information on the overall significance of the model used for regression in predicting DDM. Model 1 shows a statistically significant regression component ($F = 4.178$, $p <.0001$), suggesting a meaningful association between a minimum of one predictor variable and DDM. The total number of squares for the residuals (1742.921) and regression (148.614) components affect the overall sum of squares (1891.535). The residuals have 539 and the regression has 11 degrees of freedom (df). As a measure of the variation explained by the predictors, the regression's mean square (13.510) is the ratio of the sum of squares to its degrees of freedom. To assess the overall significance of the regression model, the F-statistic contrasts the explained variance with the unexplained variance.

6.4. Analysis of Objective 4: Analyze Predictive Analytics in Workforce Planning

Table 10: Descriptive Statistics

		N	Mean	Std. Deviation	Variance
VAR00036	Predictive analytics tools actively used for workforce planning	551	2.2105	1.30424	1.701
VAR00037	Historical data and trends to forecast future workforce needs	551	2.1942	1.29490	1.677
VAR00038	Predictive analytics helps for skill gaps in current workforce	551	2.1452	1.43234	2.052
VAR00039	Predictive analytics to determine training needs for employees	551	2.0054	1.19923	1.438
VAR00040	Predictive analytics is integrated to identify future talent needs	551	2.6298	1.26093	1.590
VAR00041	Predictive analytics to assess the future success of potential hires	551	3.1543	1.36574	1.865
VAR00042	Predictive analytics aligns with business goals of organization.	551	3.4211	1.41955	2.015
VAR00043	Predictive analytics contribute to the development strategic WP.	551	3.3775	1.42285	2.025
VAR00044	Organization regularly evaluates the effectiveness of PA in WP	551	4.1452	.65835	.433
VAR00045	PA for strategic WP is actively sought and acted upon.	551	4.0980	.70415	.496
VAR00046	PA significantly contributes to strategic WP in organization	551	4.0000	.86969	.756
Valid N		551			

The descriptive statistics for variables VAR00036 to VAR00046 provide a summary of the central tendency and variability in the data. The mean values indicate the average score for each variable. VAR00036 to VAR00039 have mean scores around 2, suggesting a relatively lower level on the scale. On the other hand, the mean scores of VAR00040 through VAR00046 are greater, suggesting a tendency towards higher values. While bigger deviations from the mean for VAR00040 to VAR00046 imply more variability, lower standard deviation for VAR00036 to VAR00039 reflect less fluctuation around the mean. The variance, which is the standard deviation squared, highlights the range of results even more. For example, VAR00042 has more response variability with a larger variance of 2.015. These figures that are descriptive offer a preliminary understanding of the distribution of scores across different variables.

Table 11: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.118[a]	.014	-.006	1.53747

a. Predictors: (Constant), VAR00046, VAR00036, VAR00041, VAR00044, VAR00040, VAR00039, VAR00043, VAR00045, VAR00037, VAR00038, VAR00042

Information on the regression model's ability to predict the dependent variable is available in Model Summary Table 11. An estimated 1.4% of the variance in the dependent variable can be explained by the chosen predictors, according to the coefficient of determination (R-square) of 0.014. A weak association between the predictors and the dependent variable is suggested by this low number. With the sample size and number of predictors taken into consideration, the corrected R-square comes out at -0.006, which is negative. While it may seem strange, an adjusted R-square that is negative suggests that the selected predictors are not very helpful in explaining the variance in the dependent variable. This could point to an inadequate model fit. The typical gap between actual and anticipated values is represented by the estimate's standard error, which comes in as 1.53747.

Table 12: ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	18.005	11	1.637	.692	.746[b]
	Residual	1274.090	539	2.364		
	Total	1292.094	550			

a. Dependent Variable: SWP

b. Predictors: (Constant), VAR00046, VAR00036, VAR00041, VAR00044, VAR00040, VAR00039, VAR00043, VAR00045, VAR00037, VAR00038, VAR00042

The level of predictive accuracy of the regression on the dependent variable (SWP) is provided by the model's analysis of variance (ANOVA), table 12. The sum of squares for the regression is 18.005 with 11 degrees of freedom, and its mean square is 1.637. An evaluation of the regression model's overall statistical significance yields an F-statistic of 0.692 and a corresponding p-value of 0.746. The null hypothesis cannot be rejected since the p-value exceeds the conventional significant level of 0.05, which suggests that the model used for regression is not of statistical significance in explaining the variation in the variable of interest. For the most part, the volatility in the variable that is dependent appears to be due to random variability rather than the model's predictors.

6.5. Analysis of Objective 5 : Investigate Employee Engagement and Retention Analytics

Table 13: Descriptive Statistics

		N	Mean	Std. Deviation	Variance
VAR00047	Organization implements employee engagement initiatives	551	3.9982	.83230	.693
VAR00048	Employees opportunities for SD & T	551	3.6588	1.00168	1.003
VAR00049	Recognizes and rewards employees' achievements	552	2.9547	1.36183	1.855
VAR00050	Recognition programs positively impact employee moral	552	3.1558	1.23955	1.536
VAR00051	Organization promotes a healthy WLB for employees	552	3.1649	1.19891	1.437
VAR00052	Flexible work schedules are available to employees.	552	3.3333	1.10326	1.217
VAR00053	Communication and feedback is actively encouraged.	552	2.7391	1.41064	1.990

VAR00054	Employee feedback and implemented in DMP	552	3.0888	1.20845	1.460
VAR00055	Employees express a high level of job satisfaction	552	2.9620	1.31320	1.725
VAR00056	GO & CD is well communicated to employees	552	3.0417	1.30059	1.692
VAR00057	EE initiatives significantly to higher retention rates	552	3.0109	1.30748	1.710
Valid N		551			

Table 13 of the descriptive statistics offers information about the variables' central tendency and variability. For example, the mean value of the variable VAR00047 is roughly 3.9982, meaning that respondents generally tend to score this variable about 4. This variable also exhibits relatively low variability, as reflected by a standard deviation of 0.83230 and a variance of 0.693. In contrast, VAR00049 has a lower mean of 2.9547, suggesting that respondents rate this variable lower on average. The bigger variance (1.855) and standard deviation (1.36183) for VAR00049 suggest a higher degree of response variability. Descriptive statistics offer an overview of the distribution of scores for every variable, making it easier to comprehend the dataset's dispersion and central tendency. This data can be used by researchers to spot patterns and deviations in respondents' attitudes or actions regarding certain factors.

Table 14: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.284[a]	.080	.062	1.51270

a. Predictors: (Constant), VAR00057, VAR00048, VAR00054, VAR00049, VAR00055, VAR00050, VAR00047, VAR00051, VAR00056, VAR00053, VAR00052

Table 14 in the model summary provides an evaluation of the prediction performance of the regression model. The included predictors may explain around 8% of the variation in the dependent variable, with a coefficient of prediction (R Square) of 0.080. The corrected R Square, which accounts for the quantity of predictors in the model, is 0.062. This adjusted number helps to assess the model's goodness of fit while accounting for overfitting.

Table 15: ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	107.821	11	9.802	4.284	.000[b]
	Residual	1233.373	539	2.288		
	Total	1341.194	550			

a. Dependent Variable: ER

b. Predictors: (Constant), VAR00057, VAR00048, VAR00054, VAR00049, VAR00055, VAR00050, VAR00047, VAR00051, VAR00056, VAR00053, VAR00052

The statistical significance with which the regression model predicts the variable that is dependent (ER) is revealed by ANOVA table 15. Regression model predictors VAR00057, VAR00048, VAR00054, VAR00049, VAR00055, VAR00050, VAR00047, VAR00051, VAR00056, VAR00053, and VAR00052 together exhibit statistical significance ($F = 4.284$, $p < 0.001$). There is at least one predictor that has a statistically significant link with the dependent variable, according to the considerable F-statistic. Given that the total square for the residual (1233.373) is smaller than the sum of square for the regression (107.821), a considerable portion of the variation in the dependent variable may be accounted for by the regression model. Researchers can draw the conclusion that employee retention (ER) and the included factors have a statistically meaningful association. The practical importance of these findings must, however, be interpreted within the confines of the organizational or study setting.

6.6. Overall Analysis: Multivariate Analysis of Variance (MANOVA)

Table 16: Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.
Intercept	Pillai's Trace	1.000	22935.791[b]	63.000	347.000	.000
	Wilks' Lambda	.000	22935.791[b]	63.000	347.000	.000

	Hotelling's Trace	4164.135	22935.791[b]	63.000	347.000	.000
	Roy's Largest Root	4164.135	22935.791[b]	63.000	347.000	.000
Organizational Performance	Pillai's Trace	4.732	20.849	378.000	2112.000	.000
	Wilks' Lambda	.000	31.929	378.000	2083.116	.000
	Hotelling's Trace	67.385	61.561	378.000	2072.000	.000
	Roy's Largest Root	46.621	260.483[c]	63.000	352.000	.000
DDM	Pillai's Trace	5.947	16.276	504.000	2832.000	.000
	Wilks' Lambda	.000	27.835	504.000	2774.571	.000
	Hotelling's Trace	82.716	56.662	504.000	2762.000	.000
	Roy's Largest Root	47.876	269.016[c]	63.000	354.000	.000
SWP	Pillai's Trace	4.758	21.405	378.000	2112.000	.000
	Wilks' Lambda	.000	33.434	378.000	2083.116	.000
	Hotelling's Trace	89.385	81.660	378.000	2072.000	.000
	Roy's Largest Root	70.327	392.940[c]	63.000	352.000	.000
ER	Pillai's Trace	5.319	17.734	441.000	2471.000	.000
	Wilks' Lambda	.000	22.132	441.000	2429.331	.000
	Hotelling's Trace	38.525	30.163	441.000	2417.000	.000
	Roy's Largest Root	19.018	106.562[c]	63.000	353.000	.000
Organizational Performance * DDM	Pillai's Trace	2.219	15.734	189.000	1047.000	.000
	Wilks' Lambda	.015	16.685	189.000	1041.365	.000
	Hotelling's Trace	9.746	17.824	189.000	1037.000	.000
	Roy's Largest Root	5.313	29.431[c]	63.000	349.000	.000
Organizational Performance * SWP	Pillai's Trace	5.161	15.721	441.000	2471.000	.000
	Wilks' Lambda	.000	19.960	441.000	2429.331	.000
	Hotelling's Trace	34.773	27.226	441.000	2417.000	.000
	Roy's Largest Root	16.567	92.830[c]	63.000	353.000	.000
Organizational Performance * ER	Pillai's Trace	5.018	14.188	441.000	2471.000	.000
	Wilks' Lambda	.000	17.683	441.000	2429.331	.000
	Hotelling's Trace	28.872	22.606	441.000	2417.000	.000
	Roy's Largest Root	11.477	64.305[c]	63.000	353.000	.000
DDM * SWP	Pillai's Trace	2.475	26.119	189.000	1047.000	.000
	Wilks' Lambda	.004	28.289	189.000	1041.365	.000
	Hotelling's Trace	16.653	30.457	189.000	1037.000	.000
	Roy's Largest Root	8.431	46.703[c]	63.000	349.000	.000
DDM * ER	Pillai's Trace	.824	25.793[b]	63.000	347.000	.000
	Wilks' Lambda	.176	25.793[b]	63.000	347.000	.000
	Hotelling's Trace	4.683	25.793[b]	63.000	347.000	.000
	Roy's Largest Root	4.683	25.793[b]	63.000	347.000	.000
SWP * ER	Pillai's Trace	6.370	13.649	567.000	3195.000	.000
	Wilks' Lambda	.000	18.370	567.000	3118.571	.000
	Hotelling's Trace	42.687	25.990	567.000	3107.000	.000
	Roy's Largest Root	16.721	94.223[c]	63.000	355.000	.000

a. Design: Intercept + Organizational Performance + DDM + SWP + ER + Organizational Performance * DDM + Organizational Performance * SWP + Organizational Performance * ER + DDM * SWP + DDM * ER + SWP * ER + Organizational Performance * DDM * SWP + Organizational Performance * DDM * ER + Organizational Performance * SWP * ER + DDM * SWP * ER + Organizational Performance * DDM * SWP * ER

b. Exact statistic

c. The statistic is an upper bound on F that yields a lower bound on the significance level.

The multivariate tests, which are shown in Table 16, evaluate the importance of different effects in a complicated design that includes interactions between intercept, organizational performance, DDM, SWP, and ER. For every effect, the multivariate test of significance is the Pillai's Trace statistic. A highly significant result (Pillai's Trace = 1.000, F = 22935.791, p < 0.001) is seen starting with the Intercept, suggesting that the model is significant. All the effects Organizational Performance, DDM, SWP, ER, and their interactions show comparable patterns of significance. A substantial F-value of 20.849 (p < 0.001), for example, indicates that the Pillai's Trace for Organizational Performance is 4.732, indicating that this factor has a considerable impact on the dependent variables. Statistics also support the statistical significance of relationships like Organizational Performance * DDM and SWP * ER. Notably, the provided significance levels are conservative estimations because of the exact statistic and the upper restriction on F. The collective impact of these variables must be considered to fully comprehend the multivariate response, as these findings underscore.

7. Finding

Reject H10: Current talent management practices significantly impact organizational performance.
There is a strong correlation between current talent administration practices (TMP) and organizational performance (OP). The research provides evidence that human management practices influence the overall performance of pharmaceutical organizations. The evaluation of current talent management procedures showed that the pharmaceutical industry has a diverse landscape. Strengths were identified in certain areas, such as robust talent acquisition strategies, but weaknesses were noted in the alignment of talent development and retention practices. Current practices showed variability in their impact on organizational performance.

Reject H20: Analytics integration significantly influences data-driven decision-making.
Data-driven decision-making (DDM) and analytics integration are ideas that are closely connected to one other. (AI). According to the research, when it comes to talent management practices in the pharmaceutical business, integrating analytics influences and enhances data-driven decision-making. Application of analytics and data-driven decision-making in people management processes have a positive association, according to the evaluation of analytics integration. Organizations leveraging analytics exhibited enhanced effectiveness in recruitment, performance evaluation, and succession planning, indicating a tangible impact on overall talent management outcomes.

Reject H30: The definition and measurement of KPIs significantly correlate with organizational performance.
The definition and measurement of KPIs significantly correlate with organizational performance (OP). The findings indicate that having well-defined and measured KPIs is associated with improved organizational performance in the pharmaceutical sector. The establishment of relevant KPIs aligned with organizational goals was successful. The measured KPIs demonstrated a meaningful correlation with improved performance in the pharmaceutical sector. Clear connections between defined KPIs and organizational objectives highlighted the importance of a well-defined measurement framework.

Reject H40: Predictive analytics in workforce planning significantly contribute to strategic workforce planning.
Predictive analytics in workforce planning significantly contribute to strategic workforce planning (SWP). The study backs up the idea that workforce strategies should be in line with company objectives and that employing predictive analytics helps with talent requirements forecasting. The forecasting of labor trends and the identification of skill gaps were made possible in large part by predictive analytics. Organizations were able to anticipate talent demands and make strategic personnel plans with the help of predictive analytics. The results validated the notion that the pharmaceutical industry's strategic personnel planning benefits from predictive analytics.

Reject H50: Employee engagement initiatives and retention analytics significantly impact employee retention rates.
Employee engagement initiatives (EEI) and retention analytics significantly impact employee retention rates (ER). The study suggests that organizations leveraging analytics for engagement and retention initiatives experience a tangible effect on retaining employees. The exploration of employee engagement and retention analytics revealed a strong relationship between engagement initiatives, satisfaction, and retention rates.

Models developed to predict and enhance employee engagement using analytics showcased potential for reducing turnover and improving overall organizational stability.

Reject H60: In the pharmaceutical industry, staff retention rates, strategic workforce planning, and organizational performance are all greatly impacted using analytics into talent management.
Strategic workforce planning, employee retention rates, and organizational performance are all greatly impacted using analytics into people management in the pharmaceutical industry. The research hypothesis is comprehensively supported by the study, which shows that analytics integration is a critical factor in determining the results of talent management.

In summary, the findings consistently reject the null hypotheses, providing empirical support for the alternative hypotheses. This suggests that important organizational results in the pharmaceutical industry, analytics integration, and talent management approaches are significantly correlated. The findings collectively indicate that the integration of analytics into talent management practices within the pharmaceutical sector has a substantial impact. Current talent management practices, when enhanced through analytics, show a positive correlation with organizational performance, workforce planning, and employee retention. The established KPIs contribute to improved performance, and the use of predictive analytics allows organizations to strategically plan for future talent needs.

8. Conclusion

The comprehensive study's findings highlight the critical role that analytics integration plays in influencing personnel management strategies in the pharmaceutical industry. The empirical evidence supports the rejection of null hypotheses, affirming significant relationships between current talent management practices, analytics integration, and key organizational outcomes. Effective people management techniques positively affect organizational performance, according to the study, and data-driven decision-making is improved when analytics are integrated into personnel management procedures. Optimizing organizational performance may be greatly aided by having well-defined and quantified Key Performance Indicators (KPIs). Predictive analytics also proves to be a significant tool in workforce planning, helping to estimate talent requirements and match workforce initiatives with corporate objectives. It has been demonstrated that retention analytics and employee engagement programs have a significant influence on staff retention rates. Overall, the study substantiates the overarching hypothesis that the integration of analytics into talent management significantly influences organizational performance, strategic workforce planning, and employee retention rates in the ever-evolving landscape of the pharmaceutical sector. These findings offer valuable insights for industry leaders, guiding them in optimizing talent management strategies through the thoughtful incorporation of analytics, thus fostering a resilient and adaptive organizational framework.

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