Relating Analytics for Employee Turnover to Strategy of Organizations

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Abstract

Companies spend a lot of time and money training their employees, and when they leave, it hurts. When employees leave the company, it's important to know why they're leaving. An organization can't apply the same analytical method for each and every one of its employees, regardless of the industry or kind of business. We created two groups called cost leaders and differentiators to categorize firms based on strategy, structure, and uncertainty. In order to decrease employee turnover, cost leaders utilize 'predictive/prescriptive analytics, whereas differentiation leaders use 'descriptive/diagnostic' analytics to do so. It is critical for HR Analytics to pay attention to the organization's strategy and structure.

Keywords
Organizational Strategy, HR Analytics, Employee Turnover.

1. Introduction
Official decisions have been more promising and precise as a result of the application of human resource analytics. For example, an essential approach for assessing staff retention rates for employee turnover is human resource analytics (HR analytics). It provides information to the organization about why employees leave and stay. For example, underperformance, rewards, a lack of competence, or something else may be at fault. Human resource analytics may also be beneficial in identifying areas where employees are having difficulty meeting their goals and objectives (Angrave et al., 2016, Olubusayo, 2020, Van Den Heuvel & Bondarouk, 2017).

Exit and stay interviews, employee surveys, and team evaluations are tools that human resources can utilize to uncover the underlying cause for employee turnover and design retention plans. We can identify the root cause of employee turnover in a cost leadership or differentiation-based business by employing the appropriate sort of analytics. Employee turnover costs firms thousands of millions of dollars each year and can be prevented. Using analytics, you can better anticipate the future over time (Kremer, 2018).

1.1. Human Resource Analytics

The Human Resource department at a business may have the worst reputation of any of the departments in the organization. In contrast to sales, human resources don't have a reputation for earning a lot of money or playing the numbers game. As a result, it is difficult for human resources to quantify and measure its performance, just for marketing and finance. In addition, many human resources work is based on "gut feeling," which is out of date.
HR analytics has two functions combined: HR and analytics, as presented in figure 1 below.

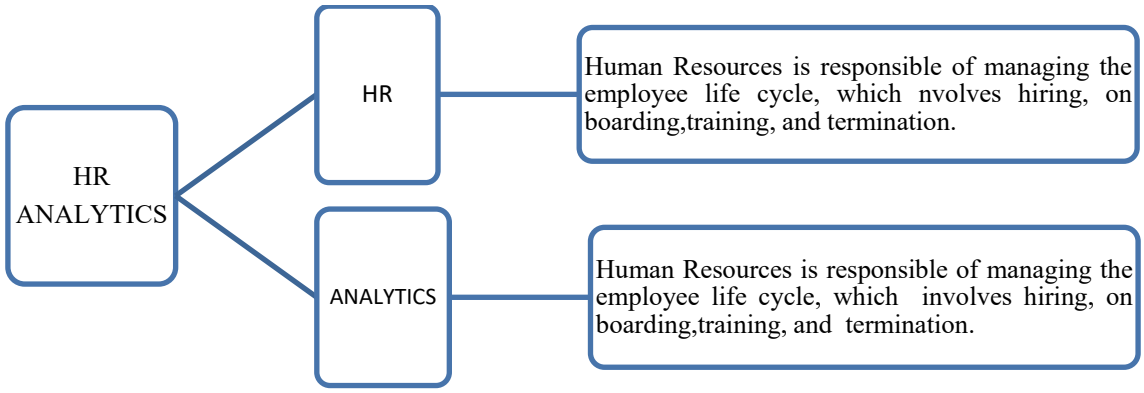

Figure 1. HR and analytics

In business, the turnover rate refers to the percentage of employees who leave their company within a specific period of time. There are two categories of turnover: those who want to leave and those who are forced to leave. Workers who leave their positions voluntarily are referred to as voluntary turnover, whereas employees who are terminated or leave involuntarily are referred to as involuntary turnover (Chalutz Ben-Gal, 2019, Marler & Boudreau, 2016, Rasmussen & Ulrich, 2015).

1.2 Organization Strategy

Strategic planning and organizational strategy aren't just for big businesses anymore. Even a one-person business should take time to consider its strategy and create measurable targets. Organizing strategy is a sophisticated long-term plan that outlines an organization's path to achieving its goals and vision.

Hofer and Schendel (1978), Miles et al. (1978), Porter (1980), and others have all studied strategic typologies, or theories of various strategy styles, which have become a common subject of study in strategic management.

Three fundamental tactics that organizations might employ to compete effectively in their particular marketplaces are outlined in Porter's Generic Competitive Strategies (Vishwakarma et al., 2019). These techniques, according to Porter, include low-cost leadership, differentiation, and focus methods, among others. Maintaining a low-cost leadership strategy involves a never-ending search for ways to reduce costs across the organization. Porter's general strategies include differentiating oneself from the competition. When a corporation seeks to differentiate itself from the competition, it provides its customers with a higher or unique value. When a company concentrates on a certain consumer group or target specialty, it is said to be in focus. Also emphasized is using a restricted competitive range within a given market (Mondal et al., 2016, Niraj Kumar Vishvakarma, 2016).

Using a cost leadership strategy offers both benefits and cons when it comes to organizations. Cost leaders concentrated on efficiency and leveraged it as a competitive advantage in the cost reduction was driven business environment. On the other hand, small capital enterprises would be subjected to price wars as a result of high-priced competitors refusing to deal directly with a more lucrative competitor (Krittika et al., 2017).

In order to separate themselves from the competition, differentiation strategy-based organizations are focused on innovation and strive to offer distinctive products or services. Using superior quality, design, manufacturing line, customer service, after-sale service, advertising, or brand image, an organization attempts to gain a competitive edge over its competitors. End-to-end performance and excellent quality are fundamental components of differentiating characteristics. Using differentiating approaches can provide a variety of advantages that can assist you in carving out a distinct niche in your industry. It is also possible that differentiation is based on organizational structure. A company's performance is determined by factors such as its brand identity, competitive advantage in a particular market, goodwill, and customer loyalty (Krittika et al., 2017, Vishwakarma et al., 2019).

1.3. Organizational Structure

An organizational structure describes the way activities such as work distribution, cooperation, and supervision are oriented toward the achievement of the company's goals in order to achieve those goals. The structure of an entity determines its character and serves as the framework for processes and rules and regulations, and laws. Employees in conventional organizational structures are often arranged by position (for example, finance or operations), area, or product line, among other things. Structures that are less traditional are loosely knit and adaptable, allowing them to adapt quickly to constantly changing market settings and conditions (Chatterjee, 2014) .

For the purposes of this research, we have concentrated on five significant elements of structure, namely standardization, centralization, formalization, specialization, complexity, and complexity of the workflow process. The structure may be found in any organization. It creates authority and communication points and the distribution and coordination of missions and resources, among other things. This study explores the systemic aspects of restaurant businesses that are most favorable to applying Porter's generic methods. Complexity, specialization, and centralization were the three qualities identified as being present in the system.

The term "centralization" refers to the location of power for making decisions that influence the organization (Pugh et al., 1968). In the business world, specialization is defined as the amount to which a firm is skilled in its product development and service provision within an industry. The degree of differentiation that occurs within organizations is referred to as their level of complexity (Fredrickson, 1986, Zheng et al., 2010).

1.4. Relationship between organizational structure and strategy

The link between organizational strategy and organizational structure must be thoroughly investigated. This assisted us in determining the character of an organization, whether it is formal, semi-formal, or informal, and how to best approach them. A structural feature that affects the choice of organizational structure is centralization, specialization, and complexity of workflow (Mondal et al., 2016, N. K. Vishvakarma et al., 2015).
Centralization is prevalent in cost leadership companies since all workers work together. Differentiators have a high degree of complexity in their workflows since they are less rule-bound and emphasize interdepartmental subcommittees. In comparison to cost leaders, specialization is a weak differentiator since they are primarily focused on innovation.

1.5. Uncertainty in Organization

As environmental dynamism and unpredictability continue to grow, the world in which businesses operate will become more unpredictable. Management's primary responsibility will continue to be the development of techniques for reducing, absorbing, counteracting, or completely eliminating uncertainty (Jauch & Kraft, 1986). Because influential factors in the environment are interrelated, interdependent, and sophisticated, it is required to separate the environment for research. Uncertainty is defined as "the incapacity of a person to predict anything with precision" (Miller, 1999). This may be owing to a lack of data, or it may be due to ambiguous and contradictory data (Gudykunst et al., 1987, Gudykunst & Nishida, 2009). (Gudykunst et al., 1987) asserted that external uncertainty arises from technological change and market shift, whereas internal uncertainty consists of uncertainty arising from organizational strategy and structure.

When dealing with quality issues, management must also consider external influences (such as consumers, suppliers, competitors, and technology). Whether environmental uncertainty exists, where it comes from, and how large it is would have an impact on the firm's aims. Therefore, it is necessary to bring uncertainty into sharp focus. Technology uncertainty refers to the uncertainty around changes in the industry's technical resources and capabilities.

1.6 Analytics

The world in which we live will continue to be driven by data. Analytics is the tool that today's employees use to integrate how their organization functions and identify areas that require improvement from a business standpoint. Data analytics is basically the key to sound decision-making since it gives important insight into whether or not a firm is moving in the right direction (Angrave et al., 2019, Fernandez & Gallardo-Gallardo, 2021).

There are three main categories of analytics i.e., descriptive, predictive, and prescriptive. Descriptive analytics is concerned primarily with what has occurred in the past, and it makes use of fundamental analytics methods to comprehend facts, patterns, nature, and outcomes. In order to determine churn rates, hiring costs, and absenteeism, for example, descriptive analysis can be utilized. Predictive analytics is the second stage of research, and it entails making predictions about future actions and outcomes based on previous data (Kremer, 2018). Finally, prescriptive analytics is the process of achieving the greatest results while using the least amount of resources possible. When determining the most cost-effective alternative training investment for organizational success, assistance from linear programming, simulation techniques, statistical modeling, and implementation is required (Angrave et al., 2016, van den Heuvel & Bondarouk, 2017).

An organization committed to cost leadership strives to offer products at the most affordable price. In order to offer a complete picture of how trends in the cost of items sold, operational expenses, transportation costs, labor costs, and inventory charges may vary in the future, predictive analytics can be applied. Example: We recently used analytics to construct a proof of concept for streamlining a client's workforce planning cycle, which was ultimately successful (Chalutz Ben-Gal, 2019).

Differentiation is a technique employed by businesses that create customer value via the development of innovative, high-quality items that use technology and a distinct brand image that distinguishes them from their competitors. The most critical activity for a specific organization is to develop its brand image through segmentation or audience targeting. This may be established using descriptive analytics techniques, which investigate a variety of data such as site traffic, average dollar spent per customer, and how much a particular individual contributed to or detracted from the bottom line (Marler & Boudreau, 2016, Rasmussen & Ulrich, 2015).

2. Research Gap

Unwanted employee departures frequently result in significant direct and indirect expenses, therefore, even a slight reduction in employee turnover would result in significant savings, which any company's upper-level management would appreciate. Many scholars have put in significant effort in this area, as seen by (Ballinger et al., (2016), and (G. Ballinger et al., 2011, G. Ballinger & Holtom, 2019) papers, which is important in terms of constructing factors around which predicting parameters such as efficiency and staff churning rate are built. However, the study conclusions were generated in a vacuum, with no action plan or road map for putting them into practice.

Specifically, this article examined the elements that influence the implementation of analytics in a business setting. Using statistics, we sought to narrow our focus on the organization's high employee turnover rate. Following this, we utilized Porter's generic technique to identify firms that are cost leaders and differentiate themselves from their competitors. Finally, we took into account other significant characteristics such as organizational structure, organizational uncertainty, and so on. The majority of the papers deal with applying predictive analytics in employee turnover. They make extensive use of mathematical models that incorporate a great deal of data mining and machine learning. They successfully developed a model to predict employee turnover within a company.

As opposed to constructing a predictive model without considering the essence (strategies and organizational structure) of an organization, in this paper, we concentrated on identifying the most appropriate analytics (Descriptive/Diagnostic/Predictive/Perspective) for a given organization. This study stresses how critical it is to understand the link between analytics and strategy, organizational structure, and the level of uncertainty present in a certain business. We are attempting to determine how various essential aspects such as centralization, specialization, complexity, readiness to adapt to abrupt changes in technology, government policy, and so on are in a given situation. To examine the influence of several factors on selecting the most effective analytics for predicting employee turnover in firms, we looked at efficiency, distribution, after-sales support, technical knowledge, product line, and competitive advantage.

3. Theoretical Framework

Going through the detailed literature review, various hypotheses have been proposed in this paper. The theoretical framework in this paper has been developed after going through the literature related to HR, analytics, organizational strategy, and structure. This framework is taken from unpublished PhD thesis of Ms. Sonal Gupta who has developed this framework with her guide RRK Sharma. Ms. Sonal Gupta has already collected and analyzed data on international firms (in USA, UK and other European countries); whereas we present here data on Indian firms.

Descriptive analytics is concerned mostly with the historical record. The first step is to figure out what is going on most of the time. That is exactly what descriptive analytics is intended to do. The organization's goal is to gather information and statistics on who, what, when, and where it is happening. The excellent thing is that technological advancements will allow you to quickly get this knowledge. Next, assess the harm that has already been done in the domain of human resource management in order to determine the fundamental reason of higher turnover. Surprisingly (or perhaps not), it is not unusual for a single firm to analyze turnover in various ways, indicating a lack of ability to make fair comparisons throughout the organization. In order to begin, make certain that resignation rates are computed uniformly across all divisions and locations (if you have multiple offices). When going through the data presented by this metric, keep an eye out for the names of those who have resigned: Is it a standout performer in its field? Who are the senior executives in this organization? We may use study-based techniques, brainstorming, or simply checking for a core trend and data dispersion to discover and correct this problem. However, as you may be aware, the effectiveness of analytics is highly reliant on the organization's goals, whether they be to achieve cost leadership or to serve as a competitive differentiator. The following hypothesis is proposed as a result of our findings (Hussain & Lee, 2016, Kaur & Phutela, 2018, Williams, 2011).

H1.a: Descriptive analytics is used in a differentiation strategy-based organization for employee turnover.
H1.b: Descriptive Analytics is used in Cost leadership strategy-based organization for employee turnover.

"What happened?" can be answered with diagnostic analytics. Using the information gathered in phase one, the organization will be able to draw some judgments about the current condition (descriptive analytics). A technology solution may make it possible to filter data in a variety of ways in order to identify new causes and relationships. For example, following your discovery that you have a retention problem, you may use workforce analytics to understand more about what is causing your employees to depart. Using the resignation rate as a starting point, do an analysis using a clustering method to determine what factors impact resignations, i.e., using performance indicators (significant qualities) to determine the likely cause behind special/uncommon behavior. You may successfully target and fine-tune your retention strategy based on this information (and not intuition or anecdote). Instead of publishing specific metrics, such as salary ratio, advancement wait time, wage raises, tenure, results, and training opportunities, investigate how aspects such as salary ratio, advancement wait time, wage raises, tenure, results, and training opportunities affect resignations. Because you've discovered these correlations, you may be able to provide employees with the information or compensation they're searching for before they resign. As you may be aware, analytics is mainly dependent on the approach used by a firm, whether it is to implement a cost-cutting strategy or gain a competitive edge (DiClaudio, 2019, Margherita, 2021, Olubusayo, 2020). As a result, the following hypothesis is put forth:

H2.a: Diagnostic analytics is used in a differentiation strategy-based organization for employee turnover.
H2.b: Diagnostic analytics is used in Cost leadership strategy based organization for solving employee turnover problem.

Predictive analysis is concerned with events that will occur in the future. What would the scenario be like if none of the relevant circumstances were to alter their behavior? Alternatively, if only one factor is changed, what impact would this have on the outcome? Organizations cannot and most likely will not make significant improvements all at once. They wish to make changes rationally and make the greatest possible use of their money resources. It also aids in accepting and embracing change by those who use it. Using this type of predictive analytics makes it possible to identify which employees are on the verge of resigning before they actually send in their resignation letters. There are some people who cannot be avoided, but keeping even a few essential jobs for longer than one year will result in significant savings. It is also possible that predictive analytics will find previously undetected connections between critical elements that drive employee turnover. A typical predictor variable is a pay. Other popular predictor variables

include promotion, performance evaluations, time spent at work, travel distance, and relationship with management (DiClaudio, 2019). HR teams and managers use it to create better timely interventions to help retain personnel based on the modeling outcomes (linear analysis, simulation analysis). According to what we know, some firms are concerned with cost reduction, while others are concerned with being innovators. Implementing a one-size-fits-all retention policy, as previously stated, is diametrically opposed to strategic human resource management. The following hypothesis is put forward: If you try to employ some sort of analytics without first knowing about strategy and structure, and organizational complexity, there's a good chance you won't get the most out of it (Angrave et al., 2016, Kakulapati et al., 2020).

H3.a: Predictive analytics is used in a Cost Leadership strategy-based organization for employee turnover.
H3.b: Predictive analytics is used in differentiation strategy-based organization for employee turnover.
With predictive analytics comes the question of "What should we be doing?" During the predictive analytics period, the organization takes into account all of its possibilities. During the prescriptive analytics process, decisions are made about what to do. As soon as you determine where you should focus your efforts, you can begin designing a solution based on your understanding of what drives key individuals away and what maintains them at your firm. This will be done through the use of an optimization and validation analysis. All of the elements that contribute to resignations are identified and ranked in real-time by the solution, enabling the implementation of initiatives to reduce the rate of resignations while also retaining high-performing or important staff. It has been demonstrated that the solution accurately predicts the likelihood that employees will retire when all relevant employee attributes are considered. Comparing resignation rates across locations, positions, tenure, age groups, diversity, and other groups can help you determine where to focus your program investments in order to maximize their impact. Stop and consider a more scientific approach to designing and implementing these solutions before rushing to introduce a new set of factors into your already complex workplace atmosphere (Lepenioti et al., 2020, Pape, 2016). Only in this way will you receive comprehensive assistance for what your organization truly requires: an effective retention problem solution. According to what we all know about prescriptive analytics, it is a more advanced kind of analytics, and applying it to a little issue would be inefficient in terms of money (Berk et al., 2019, King, 2016, Margherita, 2021, Pessach et al., 2020). Check if using prescriptive analytics in the organization to handle a key problem while remaining cost-effective is warranted, as some businesses are solely focused on cost minimization. There is a considerable probability that adopting prescriptive analytics will not be cost-effective if you don't first grasp the organization's approach before using it. Following as a result, the following hypothesis is put forth:

H4.a: Prescriptive analytics is used in a Cost Leadership strategy-based organization for employee turnover.
H4.b: Prescriptive analytics is used in differentiation strategy-based organization for employee turnover.

All the hypotheses are depicted in the following table 1.

Table 1. Summary of Hypotheses

SN	Hypothesis No.	Analytical decision making Parameters No.		Use by Cost leaders	Use by Differentiators
		Descriptive Analytics	ANA1	Low	High
	H1		ANA2	Low	High
		Diagnostic Analytics	ANA3	Low	High
	H2		ANA4	Low	High
		Prescriptive Analytics	ANA5	High	Low
	H3		ANA6	High	Low
		Predictive Analytics	ANA7	High	Low
	H4		ANA8	High	Low

4. Questionnaire development and Sampling

Reading the literature allows you to notice previous inferences from the same type of study, as well as what has and hasn't worked for other researchers in the past. It was decided that there would be four sections to the survey questionnaire for the study. People and firms who utilize HR Analytics to analyze employee performance were interviewed for this study, and the information was compiled. To ensure that no one who has no prior experience working in the business fills out the questionnaire, considerable care is required while acquiring data. In addition, researchers with a deep grasp of technology were able to link and fill in the blanks in the data. Cronbach's alpha is a measure of internal consistency, or how closely a set of things are connected to one another. It is used to determine the dependability of a scale's readings. The degree to which our study is stable and consistent is referred to as its validity. The alpha coefficient for all items in each section is more than 0.7, which indicates a data is internally consistent and valid.

4.1. Data Analysis and findings

There are several data analysis techniques have been used to analyze the data. They are presented as follows.

K Mean Clustering

It is the process of allocating data points to specific clusters based on their Euclidian distance (squared distance) from another data point and ensuring that items falling into the same cluster have the least amount of variance among them. This method employs the notion of decreasing intracluster case distance while increasing inter-cluster distance in order to get optimal results. On the basis of questionnaire items on organizational strategy and organizational structure aspects, such as specialization, centralization, and workflow complexity, clusters are constructed from the data obtained (using the k-means clustering approach) and used in the analysis. The centroid of each cluster is a collection of feature values that define the group as a whole.

The evaluation of the means acquired on the various variables will aid in the categorization process even further. For example, firms that are cost leaders have a high degree of specialization and centralization while also having a low level of process complexity, nevertheless, the qualities of differentiators are diametrically opposed to those of cost leader organizations. The details of the clusters have been presented in the annexure.

Independent Sample t-test

The independent samples t-test is the most often used type of t-test (also known as the unpaired one). It facilitates the comparison of the means of two distinct groups. Independent sample t-tests require ordinal/nominal categorical variables. We isolated two distinct samples using the K-means clustering approach. These two independent samples were selected to represent two distinct strategic groups: cost leaders and differentiators. The dependent variable in our research is the ten dimensions of major analytical levels (Descriptive/Diagnostic & Predictive/Prospective) analyzed independently for each of the two samples.

For independent samples t-test, the null hypothesis is that the two population means corresponding to each cluster are the same, i.e., there is no significant difference between groups. The Independent Samples t Test's null & alternative hypothesis (H1) can be represented in the following manner:

H0: $\mu 1 - \mu 2 = 0$ ("There is no difference in means of different groups")
H1: $\mu 1 - \mu 2 \neq 0$ ("There is a difference in means of different groups ")

Where the population means for groups 1 and 2 are 1 and 2, respectively. We have to choose a significance level that will be used to check out the viability of the hypothesis. Confidence interval is 95% , so value of significance level is most usually set to 0.05.

We examined each of the independent t-assumptions test's and discovered that each is partially or totally feasible. The null hypothesis states that the mean values of dimensions across multiple analytics levels (i.e., dependent variables) are not significantly different for both independent clusters based on organizational strategy, cost leaders, and differentiators. Additionally, we can reject the null value. If there are significant differences in the mean values, either reject the hypothesis or accept the alternative hypothesis, i.e. two distinct strategic groups were analyzed separately for the dimensions of various analytics levels. Table 2 summarizes the t-test and other metrics that may be used to better efficiently evaluate the findings.

Table 2. t test for equality of means:

S.No.	Parameters	t-test for Equality of Means				Std. Error Difference	95% CI		Null Hypothesis
		t statistic	df	Sig.	Mean diff.		Lower	Upper	
H1	ANA1	4.625	51	0.0	1.659	0.359	0.939	2.38	Rejected
	ANA2	4.791	51	0.0	1.783	0.372	1.036	2.53	Rejected
H2	ANA3	5.095	51	0.0	1.759	0.345	1.066	2.453	Rejected
	ANA4	5.549	51	0.0	1.929	0.348	1.231	2.627	Rejected
H3	ANA5	5.331	51	0.0	1.668	0.313	2.296	1.04	Rejected
	ANA6	4.025	51	0.0	1.381	0.343	2.07	0.692	Rejected
H4	ANA7	4.001	38.954	0.0	1.458	0.364	2.195	0.721	Rejected
	ANA8	5.397	51	0.0	1.962	0.353	2.671	1.254	Rejected

For hypothesis H1 concerning descriptive analytics identified by application of case study (V1) and brainstorming(V2) in organizations, Levene's test gives F values of 2.336 and 0.994 with a significance (p-value) of 0.133* and 0.346* respectively, indicating equal variance in both classes. The mean values of both variables (V1 & V2) of descriptive analytics are higher for differentiators than cost leaders, i.e. $\mu D > \mu CL$ (3.83 > 2.17) & (3.78 > 2.00) respectively which means differentiators use case study and brainstorming technique more frequently than cost leaders for predicting Employee turnover in their organization. V1 and V2 have t static values of 4.625 and 4.791, respectively, with a significance (p-value) of 0.000, indicating a substantial difference in means of both descriptively analytics variables between the two strategic classes namely differentiators and Cost leaders. As a result, the null hypothesis is rejected, and H1 (H1a and H1.b) is supported. From the Study, We inferred that Differentiators use descriptive analytics to predict employee turnover in a particular organization. For hypothesis H2 concerning diagnostic analytics identified by application of visualizing performance indicators to find reason behind specific pattern (V3) and significant attributes (V4) in organizations, Levene's test gives F values of 3.294 and 2.379 with a significance (p-value) of 0.075* and 0.129* respectively, indicating equal variance in both classes. The mean values of both variables (V3 & V4) of diagnostic analytics are higher for differentiators than cost leaders, i.e. $\mu D > \mu CL$ (3.83 > 2.07) & (3.70 > 1.77), respectively which means differentiators use these technique more frequently than cost leaders for predicting Employee turnover in their organization. V3 and V4 have t static values of 5.095 and 5.549, respectively, with a significance (p-value) of 0.000, indicating a substantial difference in means of both diagnostic analytics variables between the two strategic classes, namely differentiators and Cost leaders. As a result, the null hypothesis is rejected, and H2 (H2a and H2b) is supported. From the Study, We inferred that Differentiators use diagnostic analytics to predict employee turnover in a particular organization.

For hypothesis H3 concerning predictive analytics identified by application of predicting future(V5), application of simulation technique(V6), and identifying short to mid-term trends (V7) in organizations, Levene's test gives F values of 2.359,2.386 and 1.918with a significance (p-value) of 0.131*, 0.129* and 0.172* respectively, indicating equal variance in all classes. The mean values of all variables (V5, V6 & V7) of predictive analytics are higher for cost leaders than differentiators, i.e. $\mu CL > \mu D$ (4.23 > 2.57), (4.03 > 2.65) & (4.17 > 2.43) respectively which means Cost Leaders use this technique more frequently than a differentiator for predicting Employee turnover in their organization. V5, V6, and V7 have t static values of 5.331, 4.025, and 4.995 respectively, with a significance (p-value) of 0.000, indicating a substantial difference in means of all predictive analytics variables between the two strategic classes, namely differentiators and Cost leaders. As a result, the null hypothesis is rejected, and H3 (H3a and H3b) is supported. From the Study, We inferred that Cost Leaders use predictive analytics to predict employee turnover in a particular organization.

For hypothesis H4 concerning prescriptive analytics identified by application of recommending solution after analyzing data (V8), application of validation technique(V9), and optimization technique (V10) in organizations, Levene's test gives F values of 6.040,1.597 and 0.489 with a significance (p-value) of 0.017*, 0.212* and 0.488* respectively, indicating unequal variance for ANA8 and equal variance in ANA9 & ANA10. The mean values of all variables (V8,V9 & V10) of prescriptive analytics are higher for cost leaders than differentiators, i.e. $\mu CL > \mu D$ (4.07 > 2.61), (4.27 > 2.30) & (4.10 > 2.48) respectively which means Cost Leaders use these technique more frequently than differentiator for predicting Employee turnover in their organization. V8,V9 and V10 have t static values of 4.001, 5.397 & 4.569, respectively, with a significance (p-value) of 0.000, indicating a substantial difference in means of all predictive analytics variables between the two strategic classes namely differentiators and Cost leaders. As a result, the null hypothesis is rejected, and H4 (H4a and H4b) is supported. From the Study, We inferred that Cost Leaders use prescriptive analytics to predict employee turnover in a particular organization.

As a result of the preceding discussion, we may conclude that our research framework for this study is valid, as most of the hypotheses are supported. This supports our argument that type of Analytics used in an organization is highly dependent on the strategic orientation of the respective organizations. displays the summary of investigations of all developed hypotheses of our study (table 3, table 4 and table 5).

Table 3. Hypotheses Supported/Rejected

S.No.	Hypothesis No.	Parameters		Cost leaders	Differentiators
1	H1	DescriptiveAnalytics	ANA1	Low Supported	High Supported
			ANA2	Low Supported	High Supported
2	H2	DiagnosticAnalytics	ANA3	Low Supported	High Supported
			ANA4	Low Supported	High Supported
3	H3	PredictiveAnalytics	ANA5	High Supported	Low Supported
			ANA6	High Supported	Low Supported
4	H4	PrescriptiveAnalytics	ANA7	High Supported	Low Supported
			ANA8	High Supported	Low Supported

5. Conclusion

We learned that if a corporation pursues a cost-leader approach, it should employ Predictive/Prescriptive Analytics techniques to achieve success. To estimate future employee behavior, they utilize linear equation and simulation approaches to analyze historical data from employees who have left firms and forecast future behavior for existing employees. As a consequence, there will be less turnover among the workforce. It will boost the efficiency and profit of the firm while decreasing the company's loss. From the perspective of human resources, the most essential duty of a distinctive company is to ensure that its people have a work-life balance while still preserving its brand image.

Description analytics approaches are used to examine a range of metrics such as an employee's efficiency, revenue per employee, how much skill an employee has in his or her field of interest, and how his or her behavior influences the behavior of other persons in the business. With the use of diagnostic analytics, we will discover the reasons why our key workers wish to leave our company.

References

Angrave, David, Andy Charlwood, Ian Kirkpatrick, Mark Lawrence, and Mark Stuart, 'HR Analytics: A Modern

Tool in HR for Predictive Decision Making', *Human Resource Management Journal*, 26.1, 1–11, 2019
Olubusayo, O O, 'Human Resource Analytics Dimensions and Employee Engagement in Manufacturing Industry in Nigeria: A Conceptual Review', *Journal of Management Information and Decision Sciences*, 23.5 629–37, 2020
Van Den Heuvel, Sjoerd, and Tanya Bondarouk, 'The Rise ,and Fall? Of HR Analytics: A Study into the Future Application, Value, Structure, and System Support', *Journal of Organizational Effectiveness*, 4.2 157–78, 2017,
Kremer, Krisztian, 'HR Analytics and Its Moderating Factors', *Vezetéstudomány / Budapest Management Review*, 49.11, 62–68, 2018
Chalutz Ben-Gal, Hila, 'An ROI-Based Review of HR Analytics: Practical Implementation Tools', *Personnel Review*, 48.6, 1429–48, 2019
Marler, Janet H., and John W. Boudreau, 'An Evidence-Based Review of HR Analytics', 3–26, 2016.
Rasmussen, Thomas, and Dave Ulrich, 'Learning from Practice: How HR Analytics Avoids Being a Management Fad', *Organizational Dynamics*, 44.3, 236–42, 2015
Hofer, C W, and D Schendel, *Strategy Formulation: Analytical Concepts*, *New York*, 1978, MCMLXXXVI https://doi.org/10.1080/08276331.1992.10600415
Miles, Raymond E, Charles C Snow, Alan D Meyer, and Henry J Coleman, 'Organizational Strategy, Structure, and Process', *Academy of Management Review*, 3.3, 546–62 ,1978.
Porter, Michael E, *Competitive Strategy*, *New York: Free Press*, 1980, I https://doi.org/10.1108/eb025476
Vishwakarma, Niraj Kumar, Rohit Singh, and Sharma R.R.K., 'Internet of Things Architectures: Do Organizational Strategies Matters?', *Business Process Management Journal*, 26, 102–31 ,2019 .
Mondal, Atanu, R R K Sharma, and Niraj Kumar Vishvakarma, 'Linking Strategies of Organizations to Multi Agent System Typologies', 7.3, 106–10 ,2016.
Vishvakarma, N. K., 'Key RFID Implementation Factors Affecting " Sourcing " Decision of RFID Systems in Supply Chain of Manufacturing Industry', 1537–47, 2016
Krittika, N. K. Vishvakarma, R. R. K. Sharma, and K. K. Lai, 'Linking Big Data Analytics to a Few Industrial Applications: A Conceptual Review', *Journal of Information and Optimization Sciences*, 38.6, 803–12 ,2017.
Chatterjee, Devjani, 'Management Control Systems and Hofstede's Cultural Dimensions: An Empirical Study of Innovators and Low Innovators', *Global Business Review*, 2014 https://doi.org/10.1177/0972150914535144
Pugh, D. S., D. J. Hickson, C. R. Hinings, and C. Turner, 'Dimensions of Organization Structure', *Administrative Science Quarterly*, 13.1 ,1968.
Fredrickson, James W., 'The Strategic Decision Process and Organizational Structure', , 280–97, 1986.
Zheng, Wei, Baiyin Yang, and Gary N. McLean, 'Linking Organizational Culture, Structure, Strategy, and Organizational Effectiveness: Mediating Role of Knowledge Management', *Journal of Business Research*, 63.7, 763–71 ,2010.
Vishvakarma, N. K., R. R. K. Sharma, and Winston James, 'RELATING "INTERNET OF THINGS" ,IoT ARCHITECTURES TO STRATEGY TYPES OF ORGANIZATIONS: A CONCEPTUAL FRAMEWORK', *JOURNAL OF INTERNATIONAL MANAGEMENT STUDIES*, 2915.1 ,2015
Jauch, Lawrence R., and Kenneth L. Kraft, 'Strategic Management of Uncertainty', 777–90. 1986.
Miller, D, 'Strategic Responses to Three Kinds of Uncertainty: Product Line Simplicity at the Hollywood Film Studios', *Journal of Management*, 25.1, 97–116 ,1999.
Gudykunst, William B., Elizabeth Chua, and Alisa J. Gray, 'Cultural Dissimilarities and Uncertainty Reduction Processes', *Annals of the International Communication Association*, 10.1, 456–69 ,1987.
Gudykunst, William B., and Tsukasa Nishida, 'Individual and Cultural Influences on Uncertainty Reduction', *Http://Dx.Doi.Org/10.1080/03637758409390181*, 51.1, 23–36, 2009.
Fernandez, Vicenc, and Eva Gallardo-Gallardo, 'Tackling the HR Digitalization Challenge: Key Factors and Barriers to HR Analytics Adoption', *Competitiveness Review*, 31.1, 162–87 ,2021.
Ballinger, Gary A., Rob Cross, and Brooks C. Holtom, 'The Right Friends in the Right Places: Understanding Network Structure as a Predictor of Voluntary Turnover', *Journal of Applied Psychology*, 101.4 535–48, 2016.
Ballinger, Gary, Elizabeth Craig, Rob Cross, and Peter Gray, 'A Stitch in Time Saves Nine: Leveraging Networks to Reduce the Costs of Turnover':, , 111–33 ,2011 https://doi.org/10.1525/CMR.2011.53.4.111
Ballinger, Gary, and Brooks Holtom, 'Turnover and Social Networks', *Social Networks at Work*, , 200–227, 2019.
Hussain, Shujaat, and Sungyoung Lee, 'Visualization and Descriptive Analytics of Wellness Data through Big Data', *The 10th International Conference on Digital Information Management, ICDIM 2015*, 69–71 2016.
Kaur, Harkiran, and Aanchal Phutela, 'Commentary upon Descriptive Data Analytics', *Proceedings of the 2nd International Conference on Inventive Systems and Control, ICISC 2018*678–83 , 2018.

Williams, Graham, 'Descriptive and Predictive Analytics', *Data Mining with Rattle and R*171–77 , 2011.
DiClaudio, Michael, 'People Analytics and the Rise of HR: How Data, Analytics and Emerging Technology Can Transform Human Resources ,HR into a Profit Center', *Strategic HR Review*, 18. 42–46 ,2019.
Margherita, Alessandro, 'Human Resources Analytics: A Systematization of Research Topics and Directions for Future Research', *Human Resource Management Review* , 2021, https://doi.org/10.1016/J.HRMR.2020.100795
Kakulapati, V., Kalluri Krishna Chaitanya, Kolli Vamsi Guru Chaitanya, and Ponugoti Akshay, 'Predictive Analytics of HR - A Machine Learning Approach', 23.6, 959–69 ,2020.
Lepenioti, Katerina, Alexandros Bousdekis, Dimitris Apostolou, and Gregoris Mentzas, 'Prescriptive Analytics: Literature Review and Research Challenges', *International Journal of Information Management*, 50 57–70 , 2020.
Pape, Tom, 'Prioritising Data Items for Business Analytics: Framework and Application to Human Resources', *European Journal of Operational Research*, 252.2 687–98 , 2016.
Berk, Lauren, Dimitris Bertsimas, Alexander M. Weinstein, and Julia Yan, 'Prescriptive Analytics for Human Resource Planning in the Professional Services Industry', *European Journal of Operational Research*, 272.2 636–41 , 2019.
King, Kylie Goodell, 'Data Analytics in Human Resources: A Case Study and Critical Review', 487–95 , 2016.
Pessach, Dana, Gonen Singer, Dan Avrahami, Hila Chalutz Ben-Gal, Erez Shmueli, and Irad Ben-Gal, 'Employees Recruitment: A Prescriptive Analytics Approach via Machine Learning and Mathematical Programming', *Decision Support Systems*, 134 ,2020.

Appendix

Table 4. cluster analysis based on strategy

Strategy Variable	Cluster 1	Cluster 2
STR1	4.594	2.050
STR2	1.813	4.250
STR3	1.844	4.100
STR4	1.813	4.100
STR5	1.781	4.050
STR6	1.531	3.950
STR7	4.281	1.850
STR8	4.469	1.550
STR9	1.563	4.000
STR10	4.281	1.950
STR11	1.969	3.250
STR12	1.938	4.050
STR13	1.875	3.950
STR14	4.313	1.850
STR15	4.516	1.950
STR16	1.813	4.050
STR17	1.344	3.100
STR18	1.563	4.150
STR19	1.538	4.200

Table 5. Final cluster centers (means) for the structural variables

Structure Variable		Cluster1	Cluster2
Centralization	STRU1	4.813	1.619
	STRU2	4.688	1.667
	STRU3	4.531	1.619
	STRU4	4.438	1.571
Specialization	STRU5	4.063	1.81
	STRU6	4.406	1.476

ComplexityWorkflow	STRU7	1.194	4.409
	STRU8	1.677	4.091
	STRU9	1.419	4.182
	STRU10	1.645	4.136
	STRU11	1.387	4.136
	STRU12	1.452	4.136

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