People Analytics – MGMT 616

Group Project Report

Submitted By:
Group 2

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Name of the Company: **Cognizant Technology Solutions**

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1. Description of The Company, Strategy, Products, And People

1.1 Profile of The Company

The company was founded in 1996, as an American multinational corporation which is in IT services including digital, technology, consulting and operational services. Cognizant Technology Solutions was started as a in-house technology unit of Dun & Bradstreet and after a transitions, got IPO in 1998. The company is headquartered in New Jersey, United States.

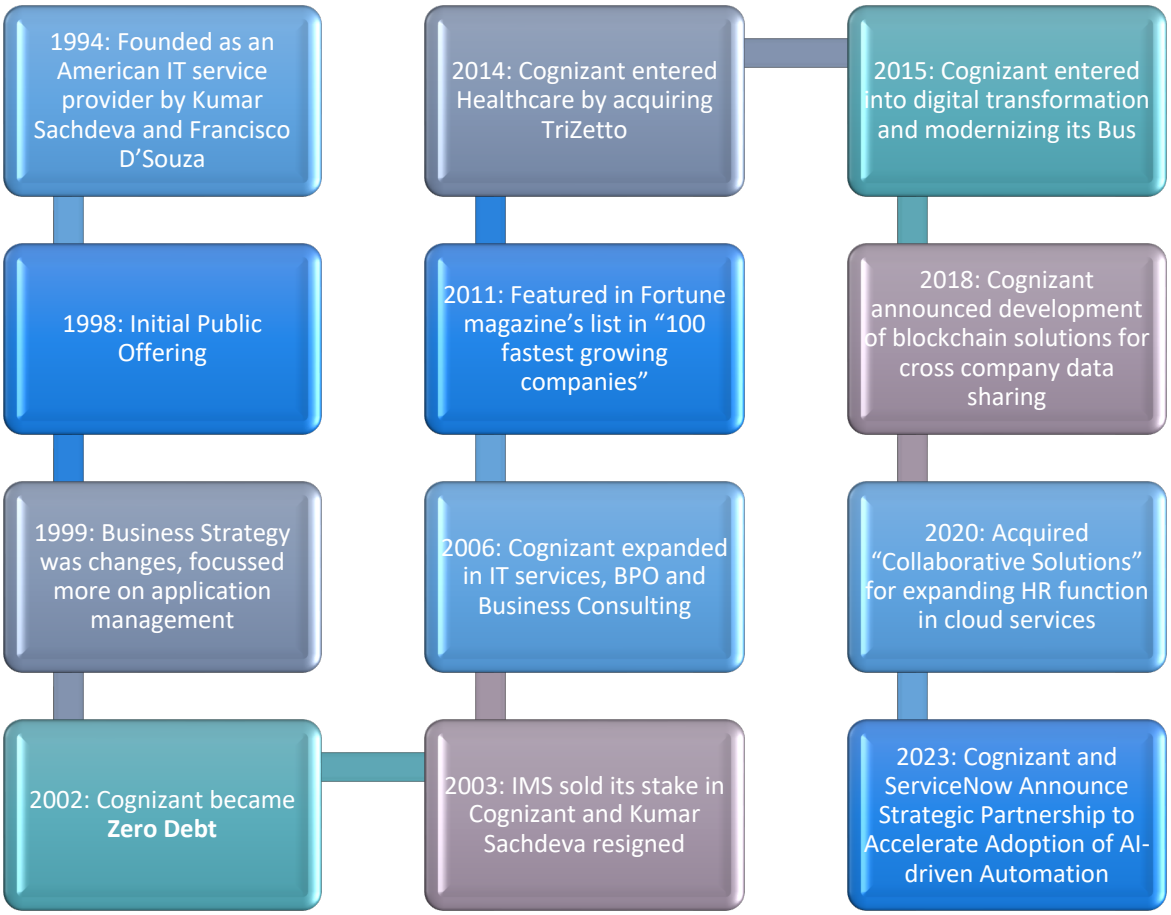
In this growing phase, Cognizant acquired many other IT service provider, supermarket retailers, Insurance Corporations to expand its horizon and started modernizing the operations across all business segments. Cognizant is well known for its fast growth during 2000s and became the fortune 500 company in 2011, earning the title of world's most admired company.

Initially, the company had two major services, Nelson Media Research and IMS Health. But later in 2003, the company expanded its work from IT services to outsourcing and consulting also. Soon, Cognizant became a familiar brand for delivering application development, CRM, business Consulting, supply chain management.

The major client base of Cognizant comes from the USA and Europe. The values and belief system of Cognizant earned it the reputation of delivering high end services and also became one of the companies in bringing the employee on H1B in the US. Cognizant is continuously expanding its employee base across globe in all the regions of operations.

1.2 Organization Leadership and Financials

CEO	Ravi Kumar S
CFO	Jan Siegmund
Chief People Officer	Kathryn (Kathy) Diaz
Revenue (Dec 2022)	4.89B
Stock Price (9 Oct 2023)	68.18 USD



Timeline graph of major occurrences of Cognizant Technology Solutions

2. Why HRM is important for Cognizant

Human Resource Management has evolved from being a non-quantitative function to a data-driven function in many organizations and the skills of HR personnel now range to a variety of business intelligence and quantitate analysis tasks.

Cognizant's employee headcount is around 351,500 employees, and it has multiple HR-subunits including HR business partners, Learning Management, Recruitment, Onboarding Team, Exit Helpdesk Team etc. Being a data-driven company, cognizant has also proposed 21 new HR roles which would be based on analytics and AI.

In the modern era, when AI and machine learning has changed the mode of working of many functions, be it customer-relationship, e-commerce, healthcare etc. Human Resource Management is not left untouched. AI in HRM is a result of applying statistical tools such as regression, co-

relation analysis, which has made it possible to analyze various employee related metrices and improve business outcomes.

Cognizant firmly believes that Workforce Analytics cannot be segregated from HR, and thus a well-planned and organized HRM department exist here which serves the purpose of taking care of the employees, uses data to make smart decisions, and helps the company adapt to the changing world of work.

3. Four ways how HRM can benefit the organization

We are conducting 4 statistical tests in SPSS, and the details of each test are given below along with the test result from SPSS.

3.1 Test 1: Employee Attrition Factors Analysis: Year 4

We are testing if what all factors are contributing to making employees leave by year 4 and finding out their significance.

3.1.1 Hypothesis:

There are multiple hypotheses being tested in this test to measure the impact of different variables on an employee's status (stay or leave) in Year 4 and are listed below:

1. If there is a significant association between employee turnover and their rating – Year 1, 2 and 3,
2. If there is a significant association between employee turnover and their gender,
3. If there is a significant association between employee turnover and their overtime work,
4. If there is a significant association between employee turnover and their department,
5. If there is a significant association between employee turnover and their daily distance to work.

3.1.2 Independent Variables and their Types:

Variable	Type
Yearly Rating	Categorical
Gender	Categorical
Overtime Hours per Week	Numerical
Department ID	Categorical
Distance from Home (KM)	Numerical

3.1.3 Dependent variable and its Type:

Variable	Type
Year 4 Status (Stay or Leave)	Binary

3.1.4 Test Analysis Technique:

Since the outcome variable in this situation is binary, we have used Binary Logistic Regression to predict the likelihood of an employee leaving the organization (voluntary turnover).

3.1.5 Results:

The results are given below in the form of SPSS output:

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Year 1 rating	-.071	.066	1.146	1	.284	.931
	Year 2 rating	-.034	.067	.255	1	.614	.967
	Year 3 rating	.620	.074	69.442	1	<.001	1.859
	Gender(1)	.168	.111	2.284	1	.131	1.183
	Distance From home (km)			11.530	7	.117	
	Distance From home (km)(1)	.264	.231	1.313	1	.252	1.302
	Distance From home (km)(2)	.141	.228	.382	1	.537	1.152
	Distance From home (km)(3)	-.074	.219	.115	1	.734	.928
	Distance From home (km)(4)	-.062	.221	.079	1	.779	.940
	Distance From home (km)(5)	-.260	.218	1.412	1	.235	.771
	Distance From home (km)(6)	-.373	.223	2.803	1	.094	.689
	Distance From home (km)(7)	.017	.226	.006	1	.938	1.018
	Overtime Hours/week	-.006	.010	.308	1	.579	.994
	Department ID			9.501	9	.392	
	Department ID(1)	-.317	.254	1.559	1	.212	.728
	Department ID(2)	.233	.258	.816	1	.366	1.262
	Department ID(3)	.189	.241	.611	1	.434	1.208
	Department ID(4)	.273	.249	1.204	1	.273	1.314
	Department ID(5)	.005	.249	.000	1	.983	1.005
	Department ID(6)	-.034	.243	.020	1	.887	.966
	Department ID(7)	.185	.263	.498	1	.481	1.204
	Department ID(8)	.052	.241	.046	1	.830	1.053
	Department ID(9)	.282	.269	1.101	1	.294	1.326
	Constant	-1.178	.453	6.756	1	.009	.308

3.1.6 Interpretation of results:

1. From the results of this test, it can be concluded that only Year 3 rating has a statistically significant (p-value <.001) positive relationship (positive coefficient) with employee status/turnover in Year 4. If the rating is high, the likelihood of that employee staying is also high and vice versa. Therefore, HR should naturally not be focusing its efforts such as extra training towards employees with low ratings, since their likelihood of leaving in the following year is high.
2. All other independent variables have a p-value > 0.05, suggesting an insignificant relationship with the dependent variable. Even though factors like overtime or department ID in this test do not meet the significance test, it is wise to examine their relationship with employee turnover as it is common for many organizations to find a substantial link between the two.

3.2 Test 2: Gender-Based Salary Analysis among Company Associates

Is there a difference in average salaries between male and female associates in the company?

3.2.1 Hypothesis:

The null and alternate hypothesis are given as:

- Null Hypothesis (H0): There is no significant difference in average salaries between male and female associates.
- Alternative Hypothesis (H1): There is a significant difference in average salaries between male and female associates.

3.2.2 Independent Variable and its Type:

- Gender (Categorical: Male, Female)

3.2.3 Dependent Variable and its Type:

- Salary (Numeric)

3.2.4 Test Analysis Technique:

We are using a t-test or analysis of variance (ANOVA) to evaluate this hypothesis.

3.2.5 Results:

The results are given below in the form of SPSS output:

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Numeric Salary	F	766	23.312	19.4671	.7034
	M	734	23.303	19.2679	.7112

		Variances		Means	
		F	Sig.	t	df
Numeric Salary	Equal variances assumed	.203	.653	.009	1498
	Equal variances not assumed			.009	1496.427

3.2.6 Interpretation of Results:

1. From The Group Statistics, there are 766 females and 734 Males in the organization. The mean salaries of both the genders are pretty much close to each (i.e., 23.312- female and 23.303- male), The difference between the Standard Deviation and Std. Error Mean is also less.
2. F is the test statistic, and ".203" is the p-value. In this case, $p > 0.05$, indicating that the assumption of equal variances is met (since p is not significant).Which shows that the variances of the two groups (Female and Male) are not significantly different.
3. But the T-test results signifies that there exists statistically significant difference in mean salaries between the two groups when assuming equal variances.

In summary, the t-test results suggest that there is a statistically significant difference in mean salaries between the Female and Male groups. However, the effect size is small, meaning that while the difference is statistically significant, it may not be practically significant or substantial.

3.3 Test 3: Gender and Promotion Duration Analysis

We are testing if there is a significant relationship between Gender and Promotion Duration. Also, whether there is difference in promotion duration between Genders.

3.3.1 Hypothesis:

There are two hypotheses being tested in this test to measure the relationship between Gender and Promotion Duration, and if any particular gender is being promoted faster than others.

1. If there is a significant association between Gender and Promotion Duration
2. If there is a significant difference between in promotion duration between Genders

3.3.2 Independent Variables and their Types:

Variable	Type
Gender	Categorical

3.3.3 Dependent Variables and their Types:

Variable	Type
Promotion Duration	Nominal Categorical

3.3.4 Test Analysis Technique:

The data analytic technique used in your analysis is a Chi-Square Test of Independence. We calculated the promotion duration and added an additional column in dataset in SPSS with a name *PromotionDurationMonths*.

3.3.5 Results:

The results are given below in the form of SPSS output:

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
PromotionDurationMonths * Gender	1500	100.0%	0	0.0%	1500	100.0%

		Gender		
		F	M	Total
PromotionDurationMonths	11.00	226	0	226
	12.00	29	0	29
	23.00	105	0	105
	24.00	110	0	110
	35.00	195	491	686
	36.00	101	241	342
	42.00	0	1	1
	71.00	0	1	1
Total		766	734	1500

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	656.646[a]	7	<.001
Likelihood Ratio	844.689	7	<.001
N of Valid Cases	1500		

a. 4 cells (25.0%) have expected count less than 5. The minimum expected count is .49.

1. In our study, we collected data from a total of 1,500 individuals. Among these: 734 participants were males and 766 participants were females
2. The Pearson Chi-Square statistic is 656.646 with 7 degrees of freedom, and the significance level (p-value) is less than 0.001 ($p < .001$). This indicates a statistically significant association between "PromotionDurationMonths" and "Gender."

3.3.6 Interpretation of Results:

1. The results indicate a statistically significant association between "Promotion Duration" and "Gender" ($p < .001$). This means that there is evidence to suggest that promotion duration varies based on an individual's gender.

2. The data indicate that, on average, females within our dataset are promoted at a faster rate (shorter promotion duration) compared to their male counterparts.
3. This finding could be seen as a positive sign in terms of gender equality in the organization. It suggests that females are advancing in their careers more rapidly, potentially indicating that they have equal access to career advancement opportunities.

3.4 Test 4: Factors Affecting 2021 Performance Ratings Analysis

To discover the variables affecting the 2021 performance ratings. The variables considered included the number of sick days taken in 2020, the perceived degree of job stress, and several other elements like job satisfaction, organizational support, and procedural justice.

3.4.1 Hypothesis:

1. If there is a significant relationship between employee 2021 rating, and the number of sick days they took in 2020
2. If there is a significant relationship between employee 2021 rating, and their perceived job stress
3. If there is a significant relationship between employee 2021 rating, and job satisfaction rating
4. If there is a significant relationship between employee 2021 rating, and perceived organizational support
5. If there is a significant relationship between employee 2021 rating, and procedural justice

3.4.2 Independent Variables and their Types:

Variable	Type
SickDays2020	Continious
ProcJust2020	Ordinal
JOBSAT2020	Ordinal
DistJust2020	Ordinal
JobStrain2020	Ordinal
POS2020	Ordinal
ValueFit2020	Ordinal

3.4.3 Dependent Variables and their Types:

Variable	Type
PerformanceRating2021	Ordinal

3.4.4 Test Analysis Technique:

Since the output variable is continuous in nature, we did a regression test to find the significant impact of independent variables on PerformanceRating2021

3.4.5 Results:

The results are given below in the form of SPSS output:

Regression

[DataSet1]

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	SickDays2020, ProcJust2020 (on a scale of 1 to 5), JOBSAT2020 (on a scale of 1 to 5), DistJust2020 (on a scale of 1 to 5), JobStrain2020 (on a scale of 1 to 5), POS2020 (on a scale of 1 to 5), ValueFit2020 (on a scale of 1 to 5)[b]	.	Enter

a. Dependent Variable: PerformanceRating2021(on a scale of 1 to 5)

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.068[a]	.005	.000	1.403

a. Predictors: (Constant), SickDays2020, ProcJust2020(on a scale of 1 to 5), JOBSAT2020(on a scale of 1 to 5), DistJust2020(on a scale of 1 to 5), JobStrain2020(on a scale of 1 to 5), POS2020(on a scale of 1 to 5), ValueFit2020(on a scale of 1 to 5)

- R-squared (R^2) = 0.005: This represents the proportion of the variance in the dependent variable (PerformanceRating2021) that can be explained by the independent variables. In this case, the R-squared is very low, indicating that the model explains only a small amount of the variation in the dependent variable.

3.4.6 Interpretation of Results:

- The regression analysis conducted on the dataset suggests that the selected independent variables, including sick days, job satisfaction, justice perceptions, job strain, and others, collectively have very limited explanatory power for predicting PerformanceRating2021, which is on a scale of 1 to 5.
- In essence, the analysis reveals that these specific variables are not meaningful predictors of performance ratings for this dataset
- Please know that even if the results are insignificant, it does not mean that test is not needed. Since it is dummy data, it could be a factor. Also, even if it had been real data, and even then, the results are insignificant then it tells us that we need to check for other factors.

References

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