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## FROM THE EDITOR'S DESK

Our journal, BJMR, is now in its fourteenth year of publication. This April 2022 Volume 14 No. 1 has five papers that cover a wide range of management subjects.

Impact of Exchange Rate Fluctuations on the Nigerian Agricultural Sector is the first paper published in the journal. It claims that the Nigerian agricultural sector has not only suffered neglect since the discovery of oil but also witnessed relatively low output compared to its previous stance. Although previous studies identified exchange rate fluctuation as a contributory factor to low agricultural output in Nigeria, the current study set out to ascertain this claim. Based on the Monetary Model of exchange rate, the study employed the autoregressive distributed lag (ARDL) technique to examine the impact of exchange rate fluctuations on the Nigerian agricultural sector output. Annual time series data was sourced from the Central Bank of Nigeria Statistical Bulletin (2021). The study found that in the short-run, exchange rate negatively impacted on agricultural output but, the effect was statistically insignificant. However, in the long-run, exchange rate positively impacted on agricultural output and the effect was statistically significant. Hence, the study concluded that the exchange rate fluctuation poses long-term effect on agricultural output in Nigeria.

The second paper, titled "Are COVID Survived Workplaces Transforming into Zen Workplaces?" depicts a case study that evolves the thought of deciphering Gandhian thoughts amongst the youth. The case focuses on Gandhian principles & is then associated with the SERVQUAL model. It focuses on journey of an established entrepreneur Mr. Ketan Desai's venture into a business idea with non-conventional line of action. His conception of Karma Café and then further assimilation between (POP) Points of parity & Points of Differentiation (POD) towards the café industry from customers perspective.

"Detecting negative attrition using predictive analytics" is the title of the third paper. The paper lays down that Employee attrition is a significant problem in companies, precisely when trained, technical and efficient employees leave for unknown reasons. Employee leaving an organization creates a void and spawns an environment where other employees also start to think in the same line. Therefore, companies should predict the reasons for negative attrition and motivate them to continue by making slight adjustments. Using a sample ( $n=1470$ ) from the IBM dataset, this study considers the role that company characteristics practices have in clarifying negative attrition. The goal of the study is to recognize the causes for negative attrition based on objective data analysis. By doing so, the predictive model helps in identifying the causes of negative attrition and also to predict which employee will leave the company. After training 70% of the IBM dataset, results are given using three accuracy standards – classification accuracy, precision, and recall. The predictive model that produced the best results for the remaining 30% of the test dataset is the neural networks model. It reveals the best classification accuracy (0.839), precision (0.824), and recall (0.839).

The fourth article, "Working Capital Management and its Impact on the Profitability of the Indian Automobile Sector," establishes that Profitability, and efficient Working Capital Management are hand to hand to make an organisation successful. Proper allocation of cash flows increases liquidity and simultaneously increases profitability. The purpose of this study is to develop the research on the relationship between Working Capital Management and efficiency by investigating how it is affected by different factors. A quantitative method will be applied in objectivism and positivism and deductive theory was used to approach the subject. Data is collected related to working capital cash management credit management and efficiency ratio to confirm, how fast a company turns purchased products into profit, with Gross Profit Margin as the measure of Profitability. The data analysed is financial information from 2019-21, collected from a secondary source, Annual Reports of the companies. The profitability, and the sensitivity to determinants of Working Capital Management is analysed.

"Future of Workforce in the World of AI" is the title of the final paper in this issue. This paper is about the increasing dependency on machines and the nonstop technological up gradations, it should not come as a surprise if machines will take control of the work. But to what extent? Would we prefer to witness robots at the selling counters, or will we speak to a virtual assistant the next time we try to connect the customer service of a company? To have an accurate answer at this point of time is baffling, but this may be the scenario, say 8-10 years down the line or maybe earlier, too, perhaps.

Therefore, this research paper is an attempt to find out whether AI will take over the work meant for and done by humans. Humans would become slave to technology or would learn adaptability.



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# Impact of Exchange Rate Fluctuations on the Nigerian Agricultural Sector

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**ABSTRACT:** *The Nigerian agricultural sector has not only suffered neglect since the discovery of oil but also witnessed relatively low output compared to its previous stance. Although previous studies identified exchange rate fluctuation as a contributory factor to low agricultural output in Nigeria, the current study set out to ascertain this claim. Based on the Monetary Model of exchange rate, the study employed the autoregressive distributed lag (ARDL) technique to examine the impact of exchange rate fluctuations on the Nigerian agricultural sector output. Annual time series data was sourced from the Central Bank of Nigeria Statistical Bulletin (2021). The study found that in the short-run, exchange rate negatively impacted on agricultural output but, the effect was statistically insignificant. However, in the long-run, exchange rate positively impacted on agricultural output and the effect was statistically significant. Hence, the study concluded that the exchange rate fluctuation poses long-term effect on agricultural output in Nigeria. Hence, policy makers should not relent in the effort to attain and maintain favourable exchange rate position.*

**Keywords:** Agricultural output, exchange rate, structural adjustment programme

## 1. Introduction

Exchange rate has been given much attention by researchers over time due to its importance in policy making especially in a highly import dependent economy as Nigeria. Exchange rate contributes to national development by positively influencing the quantity of foreign reserves as well as the import level. Every economy seeks to maintain a stable exchange rate in the international market. Therefore, for policy direction in every nation, monitoring of exchange rate fluctuation is crucial. In Nigeria, like many other African nations, currency devaluation was done with the adoption of the Structural Adjustment Programme (SAP) in 1986. The aim of currency devaluation was to achieve real depreciation, which will stimulate the demand for domestically produced goods; thereby improving the local currency relative to other currencies. However, SAP failed due to poor implementation and the goal of maintaining a stable exchange rate was not realized. Since then, economic sectors in Nigeria have been struggling with the problem of exchange rate fluctuation and the resultant changes in commodity prices.

The management of exchange rate is crucial due to its volatility and influence on investment decisions. Exchange rate fluctuation is a major macroeconomic factor in the foreign market, which has the potential of

inducing investment risk and uncertainty; thereby impacting upon aggregate output (Mahmood & Ali, 2011). Therefore, both investors and policy makers are keen about exchange rate fluctuation. Aliyu (2016) noted that exchange rate appreciation enhances imports and reduces exports, while exchange rate depreciation does the opposite. Exchange rate depreciation stimulates the consumption of locally produced goods rather than foreign ones. This results in a shift in terms of trade in favour of the exporting country. Consequently, exchange rate depreciation aids in boosting the economy of the exporting country. Hence, exchange rate is crucial for economic growth and is a major determinant of international competitiveness (Iyeli, Nenbee & Opue, 2011). To transform the Nigerian economy and enlist her among developed countries of the world, it is needful to tow the path that leads to sustained economic growth and development through a well-managed exchange rate policy. An ill-managed exchange rate policy could be harmful to the growth and development of an economy (Kalu, et al. 2019).

Nigeria has operated both the fixed exchange rate system and the flexible exchange rate system, which is market based in the past. During the post-independence era, the fixed exchange rate system was in place until 1986, when the flexible exchange rate system was embraced during



the SAP era. Currently, the prevailing system is the managed float, where the monetary authorities intervene in the foreign exchange market periodically with the aim of achieving strategic objectives. The introduction of the different regimes of exchange rates was aimed at setting the Nigerian economy on the path of sustainable growth and development (Bakare, 2011). However, the inconsistency in the exchange rate policy has been found to be responsible for the depreciation in the value of the Nigerian currency (naira) relative to other currencies (Benson & Victor, 2012).

Exchange rate fluctuation has a multiplier effect on several macroeconomic variables like interest rate, saving, investment and inflation to mention a few. Thus, exchange rate fluctuation discourages potential investors, who consider the uncertainty about the returns on investment before embarking on it. Investors will only invest in a business whose expected returns are large enough to cover the risk. In addition, due to the high import-dependence of the Nigerian economy in terms of consumption and export-dependence in terms of public revenue generation, the economy is exposed to high level of risks. The exposure of the Nigerian economy to international risks and possible attendant macroeconomic shocks to the local economy calls for a comprehensive investigation into the impact of exchange rate fluctuations on the different sectors of the Nigerian economy.

Previous studies have examined the impact of exchange rate fluctuations on economic growth. Some studies support the evidence of positive influence of exchange rate on economic growth (Akinmulegun & Falana, 2018; Isibor, et al. 2018, Iyeli & Utting, 2017), while others hold the view that exchange rate negatively influences economic growth (Bassey & Bassey, 2019; Ezenwakwelu, et al. 2019; Mlambo, 2020). Some of these views are based on the findings of the effect of exchange rate on different sectors of the economy. The current study is distinct in that focus is on the agricultural sector of the Nigerian economy, which is seen as an alternative to crude oil. Therefore, the objective of the study is to determine the impact of exchange rate fluctuation on the Nigerian agricultural sector output.

The study covered a period of 21 years; from 2000-2021. The period was purposely chosen to capture the period in

which the Nigerian economy witnessed great fluctuations in exchange rate. Data for the study are annual time series sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin (2021). The rest of the study is organized as follows: Section Two deals with the review of literature, while Section three handles the methodology of the study. Section Four presents and discusses the findings of the study, while Section Five concludes and proffers policy recommendations.

## **2. Review of Literature**

Exchangerate refers to the ratio of a country's currency to the currency of another country (Okorontah, 2016). Exchange rate could be nominal or real. The nominal exchange rate is a monetary concept which shows the amount of a country's currency that can exchange for a certain amount of another country's currency. The real exchange rate is a value concept which measures the quantity of a country's product that can exchange for a certain quantity of another country's product (Obi, Oniore & Nnadi, 2016). Considering the different regimes of exchange rate, we have the fixed exchange rate and the flexible exchange rate. A fixed exchange rate system is one in which the country's exchange rate fluctuates within a small margin or remains constant for a certain period, while a flexible exchange rate system allows for the fluctuation of the exchange rate based on the forces of demand and supply in the international market. However, every economy aims at maintaining a stable exchange rate because the exchange rate is a major factor influencing the country's trade stance (Isibor, et al. 2018). Mlambo (2020) posited that exchange rate connects the price systems of two different countries and has great influence on the volume of imports and exports, as well as the balance of payments position.

There are several theoretical literatures that connects exchange rate with economic growth. These include the optimal currency area theory, purchasing power parity and the monetary theory on exchange rate. The optimal currency area theory was propounded by Mundell and Mckinnon as in Ufoeze, et al. (2018). The theory advocates a fixed exchange rate regime that improves trade and economic growth by reducing exchange rate risk and the cost of hedging. The theory is based on the concepts of balance between degree of openness, labour



market fluidity and macroeconomic shocks. The theory supports the view that investment is improved by reducing interest rates. However, recent exchange rate policies are based on the monetary theory and the asset market approaches. Exchange rate is viewed as a financial phenomenon which is determined by financial flows rather than trade flows as suggested by traditional exchange rate theories.

Purchasing power parity (PPP) relates prices to exchange rates (Ufoeze, et al. 2018). Absolute PPP was recommended to adjust pre-World War I exchange rate parities for countries that resolved to return to the use of gold standard system after the war. The theory was later modified to suit the inflation rates experienced by other countries that abandoned the gold standard system after the war. Absolute PPP, the simple and most powerful form of PPP was based on the law of one price. Exchange rate is expected to adjust and equate the prices of national baskets of goods and services between two nations. Absolute PPP suggests that nominal exchange rate depends mostly on the factors that affect the domestic price level (endogenous factors). Another version of PPP restates the equation in terms of the ratio of the changes in nominal exchange rate to changes in relative prices.

Monetary models of exchange rates propounds that the process of balancing total demand and supply of money in a country determines the exchange rates (Ufoeze, et al.2018). The model upholds that in the long-run, the demand for money is stable and has a positive relationship with national income but, an inverse relationship with interest rate. Usually, excess supply of money in the economy leads to the depletion of reserves or a balance of payments deficit under fixed exchange rate system, and a devaluation of national currency under flexible exchange rate system. The reverse is the case for excess demand. Hence, monetary models of exchange rates suggest that exchange rate is determined by the domestic monetary authority and is an extension of the simple quantity theory of money.

$$MV = PY \quad \text{-----} \quad 2.1$$

Where M represents monetary stock, V represents velocity of circulation, P represents price level, Y represents full employment/output, with V and Y held constant, the equation becomes:

$$P = \frac{1}{V} \left( \frac{M}{Y} \right) \quad \text{-----} \quad 2.2$$

Therefore, percentage change in M equals percentage change in P.

If relative prices are determined by different monetary regimes, then it is easy to make the additional step; using the relative PPP equation, the change in domestic prices can then feed directly and proportionally into exchange rate. That is,  $\% \Delta M = \% \Delta P = \% \Delta E$ , where E represents exchange rate. Thus, exchange rate is exogenously determined and fluctuations in exchange rate are expected to have significant effects on the economy through changes in monetary stock.

The Nigerian economy has evolved over the years due mainly to the changes in exchange rate. Different exchange rate policies have been enacted to improve the economy. Before the oil boom era, the Nigerian economy had a fairly stable exchange rate from 1973 to 1979, when agricultural products formed 70% of national output (Ikpefan, Isibor & Okafor, 2016). Then, there was the flexible exchange rate regime after the adoption of the Structural Adjustment Programme (SAP). This change in policy caused a fluctuation in the exchange rate and led to the unstable nature of the naira, which had a multiplier effect on every sector of the Nigerian economy. With SAP came the Second-tier foreign exchange market (SFEM) in 1986. In 1987, the Unified official market was introduced, where both the first-tier and second-tier foreign exchange markets were merged. In 1988, Interbank foreign exchange transaction occurred, but this was suspended in 1989 due to the resultant instability in the economy (Taiwo, et al. 2016). In October, 1990, the foreign exchange market was liberalized and Interbank foreign exchange market (IFEM) was restored. By December, 1990, the Dutch Auction System (DAS) was re-introduced after its brief introduction at first in April 1987 and it was scrapped due to instability in the foreign exchange market.

In 1994, Nigeria returned to a fixed exchange rate system to check the illegal activities of the parallel market and to prevent the sale of foreign exchange by bureau-de-change firms (Isibor, et al.2018). After this, a dual exchange rate policy was introduced in 1995 to reduce the depreciation of the naira in the parallel market and ensure efficiency in the allocation of economic resources. Thus, the foreign exchange provision decree 17 of 1995 was enacted and the exchange control act of

1962 was scrapped. The decree allowed for autonomous foreign exchange trading by private firms. However, the exchange rate continued to depreciate and by 1997, the liberalization of some payments caused further depreciation in the foreign exchange (Isibor, et al.2018). In 2000, the dual exchange rate system was cancelled and the government official rate was merged with the autonomous foreign exchange rate. In 2002, the DAS was re-introduced and the retail Dutch system was embraced, where the Central Bank of Nigeria (CBN) sells foreign exchange to end-users through commercial banks. Unfortunately, exchange rate has been unfavourable to Nigerians and the naira keeps depreciating. In addition, due to the fluctuation in exchange rate, the nation has not witnessed the desired transformation of its economy.

In Asian countries, exchange rate has been impactful in determining output and exports of agricultural products. Mohamad and Jusoff (2008) used the panel fixed effect model to examine the impact of exchange rates on export growth in Asian economies. The study covered four Asian countries – Indonesia, Malaysia, Singapore and Thailand. Findings revealed that uncoordinated changes in exchange rate significantly impacted export performance. Hua (2011) investigated the economic and social effect of real exchange rate in 29 Chinese provinces using the Generalized Method of Moments (GMM). The study found that appreciation of the real effective exchange rate poses negative impact on employment and economic growth. On the effect of exchange rate on agricultural goods for export, Tulasombat, Bunchapattanasakda and Ratanakomut (2015) noted that exchange rate fluctuations negatively and significantly impacted Thailand's agricultural goods export volumes.

Ali, et al. (2020), using the non- autoregressive distributed lag (NARDL) technique, examined the impact of agriculture trade and exchange rate on economic growth of Pakistan. Findings revealed that bidirectional causal flow exists between exchange rate and economic growth. In addition asymmetric long-run association existed among the variables. Grabowski and Self (2020) investigated the determinants of structural change in Asia. The study found that due to increase in productivity in the agricultural sector over and above

manufacturing, prices of agricultural products fall. This has a multiplier effect on the general price level and the resultant effect is decline in the real exchange rate. Therefore, the competitiveness of tradable manufactured goods increases as well as employment and output, surpassing that of the agricultural sector. Also, Wiseman, Luckstead and Durand-Morat (2021) on the asymmetric exchange rate pass through in Southeast Asian rice trade found that the decision to import rice from Thailand was independent of exchange rate volatility. The NARDL technique revealed that in spite of fluctuations in exchange rate, trading enterprises in Malaysia, Indonesia, Philippines and China imported rice from Thailand based on other factors apart from exchange rate volatility.

In Nigeria, Isola, et al.(2016) noted that the agricultural sector has been declining in its contribution to national output due to the sole dependence on crude oil. The agricultural sector of the Nigerian economy, which was a major contributor to national output, was neglected after the discovery of oil and became susceptible to fluctuations in the exchange rate. Oye, et al. (2018) examined the effect of exchange rate devaluation on agricultural output in Nigeria from 1986 to 2016. Using the vector error correction model (VECM), the study found that a negatively significant relationship exists between the real effective exchange rate and agricultural output. Another study, Isibor, et al.(2018) investigated the effect of exchange rate management on output in both the agricultural and manufacturing sectors of the Nigerian economy from 1981 to 2015. Using the ordinary least square (OLS) technique, the study found that exchange rate had a positively significant effect on the agricultural sector. This finding contradicts that of Oye, et al. (2018), whose study was carried out about the same period. The disparity in findings might be due to the technique of estimation. In the literature, OLS has been faulted for its deficiency in handling the issue of endogeneity in time series data.

Furthermore, Udoh (2018) in the study on price, exchange rate volatility and Nigeria's agricultural trade flows showed that the price of agricultural exports rise when the exchange rate is more volatile; leading to a decline in export of agricultural products. On the other hand, the price of imports rises when exchange rate is

more volatile leading to rise in import of agricultural products. Therefore, Udoh (2018) agrees with Oye, et al. (2018) that an inverse relationship exists between the real effective exchange rate and agricultural output in Nigeria. A more recent study, Ikpesu and Okpe (2019) investigated the link among capital inflows, exchange rate and agricultural output in Nigeria. Using the autoregressive distributed lag (ARDL), the study found that a major determinant of agricultural output decline, both in the short-run and long-run, is exchange rate depreciation. The current study seeks to resolve the conflicting views on the link between exchange rate fluctuations and agricultural output level in Nigeria.

□

### 3. Methodology

This study was based on the Monetary Model of exchange rate. Quantitative technique of data analysis was adopted in investigating the relationship between the dependent variable, agricultural output (AGDP), and the independent variables (exchange rate and inflation rate). Annual secondary data from 2000 to 2020 obtained from the Central Bank of Nigeria (CBN) Statistical Bulletin (2020) was used in the study. The model used in this study was adapted from the work of Ufoeze, et al. (2018). In the model, GDP was the dependent variable while exchange rate, inflation rate, money supply and oil revenue were the explanatory variables. However, this current study examines the effect of exchange rate

fluctuations on agricultural output, which is a component of GDP. The model was constructed using the ARDL technique. The core advantages of the ARDL technique include robustness in the face of small samples and its ability to contain different orders of integration. The ARDL technique also reduces diagnostic problems such as autocorrelation. The model can thus be specified as:

$$\Delta \ln AGDP_t = \alpha_0 + \sum_{j=1}^p \alpha_j \Delta \ln EXCH + \sum_{i=1}^q \alpha_i \Delta \ln INF + \lambda_1 \ln EXCH_{t-1} - \lambda_2 \ln INF_{t-1} + \mu_t$$

-----3.1

Where AGDP represents agricultural contribution to GDP; EXCH represents real exchange rate; INF represents inflation rate.  $\alpha_0$  is the intercept,  $\alpha_j$  and  $\alpha_i$  are the short-run estimates of the corresponding explanatory variables,  $\Delta$  is the difference operator, and  $\lambda_1$  and  $\lambda_2$  are the long-run estimates of the explanatory variables.

The a priori expectation is that exchange rate and inflation rate will have negative relationship with AGDP. Therefore, an increase in exchange rate and inflation rate would lead to a reduction in agricultural output ceteris paribus.

## 4. Results and Discussion

### 4.1 Descriptive Statistics

Descriptive statistics were employed to determine the characteristics of the data.

**Table 4.1: Descriptive Statistics**

Variable	Observation	Mean	Std. Deviation	Minimum	Maximum
AGDP	20	13859.70	10170.34	1508.00	40012.00
EXCH	20	169.51	67.24	101.70	306.09
INF	20	12.07	3.66	5.39	18.87

**Source:** Author's Computation (Data from CBN Statistical Bulletin, 2021)

The result of the descriptive statistics shows that the agricultural sector output has a mean value of N13859.70 billion. Inflation rate has the least mean value (12.07). Also, the report reveals high deviation in the data set. The minimum value of output for the agricultural sector was recorded in 2000. Also, the minimum values for exchange rate and inflation were recorded in 2000 and

2007 respectively. The maximum value of output for the agricultural sector was recorded in 2019. The maximum values of exchange rate and inflation were recorded in 2019 and 2012 respectively. Existing literature has observed that macroeconomic variables are usually non-stationary at level. This implies that the ordinary least square regression technique will be insufficient in

estimating the impact of exchange rate on the output of the different sectors under review. Therefore, the study proceeded to examine the level of stationarity of the variables.

## 4.2 Unit Root Test

The Augmented Dickey-Fuller and Phillip-Perron unit root tests were used to reveal the properties of the variables. Table 4.2 presents the result of the all unit root test.

**Table 4.2: Unit root test**

Variables	AGDP	EXCH	INF
ADF	-2.04	0.28	-3.81***
Δ	-3.46**	-2.45**	-3.96***
PP	-4.45***	0.28	-3.81***
? PP	-3.40**	-2.45**	-9.60***

Note: \*, \*\*, \*\*\* indicate 10%, 5% and 1% level of significance respectively

Source: Author's Computation (Data from CBN Statistical Bulletin, 2021)

Table 4.2 shows that the variables were integrated of order zero and one. The implication of this result is that the some of the variables were stationary at level, while others became stationary at first difference. This informs the use of the ARDL technique to estimate the models. The study proceeded to examine the possibility of the

existence of long-run relationship among the variables using the ARDL Bounds test.

## 4.3 Test for Long-run relationship

**Table 4.3: ARDL Bounds Test**

Test Statistic	Value	k
F-stat	5.11	1
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	4.04	4.78
5%	4.94	5.73
2.5%	5.77	6.68
1%	6.84	7.84

Source: Author's Computation (Data from CBN Statistical Bulletin, 2021)

Table 4.3 shows that there is long-run relationship among the variables in Model 3.1. The result of the ARDL Bounds test shows that the F-statistic value was statistically significant at the 5% significance level (Isf). Therefore, the null hypothesis of the non-existence of long-run relationship was rejected. Furthermore, the Akaike information criteria graph in Appendix 1 showed that the model is well-fitted. Hence, based on the objective, the study proceeded to examine the impact of exchange rate fluctuation on the output of the Nigerian agricultural sector.

## 4.4 Impact of exchange rate fluctuation on Nigerian agricultural output

**Table 4.4: Short-run and Long-run Estimates**

Dependent Variable: AGDP

Selected Model: ARDL(4, 2)

Short-run Estimates				
Variable	Coefficient	Std. Error	t-Statistic	Probability
D(AGDP(-1))	0.32	0.22	1.51	0.18
D(AGDP(-2))	-0.23	0.08	-2.99**	0.02
D(AGDP(-1))	0.32	0.22	1.51	0.18
D(AGDP(-2))	-0.23	0.08	-2.99**	0.02
D(AGDP(-3))	-0.12	0.12	-0.99	0.35
D(EXCH)	-0.08	0.11	-0.68	0.52
D(EXCH(-1))	-0.26	0.16	-1.58	0.16
D(INF)	0.10	0.06	1.74	0.13
CointEq(-1)	-0.15	0.05	-2.86**	0.02
Cointeq = AGDP (1.82*EXCH + 0.67*INF 0.35)				



Long-run Estimates				
Variable	Coefficient	Std. Error	t-Statistic	Probability
EXCH	1.82	0.31	5.84***	0.00
INF	0.67	0.41	1.66	0.14
C	-0.35	1.64	-0.21	0.84

Note: \*, \*\*, \*\*\* indicate 10%, 5% and 1% level of significance respectively

Source: Author's Computation (Data from CBN Statistical Bulletin, 2021)

Table 4.4 presents the result of the ARDL test. The lag lengths for the dependent and independent variables were 4 and 2 respectively. The result provides evidence to the fact that in the short-run, only lagged agriculture value-added was statistically significant in influencing current agriculture value-added at the 5% lsf. In addition, the impact of lagged agriculture value-added was negative. Exchange rate though inversely related to agriculture value-added, was insignificant in explaining changes in agriculture value-added. This corroborates the finding of Oye, et al.(2018), who found that increase in the real exchange rate will lead to decrease in agricultural value-added. The result reveals the existence of at least one cointegrating equation and provides evidence to support the statistical significance of the result at the 5% lsf. Furthermore, the short-run result shows that the speed of adjustment of agriculture value-added to changes in exchange rate and inflation are negatively significant and less than one. This implies that exchange rate and inflation have joint statistical significance in explaining changes in agricultural output in Nigeria.

Furthermore, Table 4.4 shows that in the long-run, exchange rate positively and significantly influences agricultural output at the 1% lsf. This is in line with the finding of Isibor, et al. (2018). The result implies that a unit increase in the exchange rate in favour of the domestic economy will lead to approximately 2 unit increase in agriculture output. The rationale behind this is that agricultural products will be priced high in the foreign market and thus increase returns on the export of agricultural products. This encourages production and attracts investors into the agricultural sector.

In addition, Table 4.4 shows that inflation positively influences agricultural output both in the short-run and in the long-run. Although the result reveals that the impact of inflation on agricultural output is statistically insignificant. Also, the intercept was negatively signed and statistically insignificant in explaining changes in agricultural value-added. The non-significance of the test-statistic in the post-estimation techniques in Appendix 2 to 5 provide evidence to the validity of the results, supports the absence of serial correlation, heteroskedasticity in the series and that the selection of variables is okay.

## 5. Conclusion and Recommendation

The long abandoned agricultural sector, which was the mainstay of the Nigerian economy before the discovery of oil, has recently regained recognition due to the challenges faced in the oil sector. Also, exchange rate has been identified as a major factor influencing the level of output in the agricultural sector. Therefore, this study investigated the influence of exchange rate fluctuations on the Nigerian agricultural sector from 2000 to 2021. Using the Monetary Model of exchange rate and the ARDL technique of estimation, the study found that in the short-run, exchange rate negatively impacts on agricultural sector output; though insignificantly. In the long-run, exchange rate positively and significantly impacts on agricultural sector output. The implication of this result is that exchange rate fluctuations adversely impacts on agricultural output in the short-run. However, policy interventions could save the situation in the long-run. Therefore, Nigerian policy makers should intensify effort in attaining and maintaining favourable exchange rate position through sound monetary policies.

## References:

Akinmulegun, S. O. & Falana, O. E. (2018). Exchange

rate fluctuation and industrial output growth in Nigeria. *International Journal of Economics and Financial Research*, 5(4), 145–148.

Ali, I., Khan, I., Ali, H., Baz, K., Zhang, Q., Khan, A. & Huo, X. (2020). The impact of agriculture trade and exchange rate on economic growth of Pakistan: an ARDL and asymmetric analysis approach. *Ciência Rural*, Santa Maria, 50(4), 1-15.

Aliyu, S. R. U. (2016). Impact of oil price shock and exchange rate volatility on economic growth in Nigeria. An empirical investigation, research. *Journal of International Studies*, 26, 58-86.

Bakare, A. S. (2011). The consequences of foreign exchange rate reforms on the performances of private domestic investment in Nigeria. *International Journal of Economics and Management Sciences*, 1(1), 25-31.

Bassey, G. E. & Bassey, I. G. (2019). The effect of exchange rate deregulation on the manufacturing output in Nigeria: An Auto-Regressive Distributed Lag (ARDL) Approach. *International Journal of Economics, Commerce and Management*, 7(12), 813–831.

Benson, U. O. & Victor, E. O. (2012). Real Exchange rate and macroeconomic performance: Testing for the Balassa-Samuelson hypothesis in Nigeria. *International Journal of Economics and Finance*, 4(2), 127-134.

Central Bank of Nigeria (2021). Statistical Bulletin, Central Bank of Nigeria (CBN).

Ezenwakwelu, C. A., Okolie, P. I., Attah, E. Y., Lawal, K. O. & Akoh, O. (2019). Exchange rate management and performance of Nigerian manufacturing firms. *Academy of Entrepreneurship Journal*, 25(4), 1528-2686.

Grabowski, R. & Self S. (2020). Structural Change in Asia, Real Exchange Rate and Agricultural Productivity. *Journal of Economic Finance* 44, 198-210.

Hua, P. (2011). The economic and social effect of real exchange rate – Evidence from the Chinese provinces. *Proceedings of the International Conference on Social Cohesion and Development*, OECD Development Centre, Paris, France, 20-21 January 2011.

Ikpefan, O. A., Isibor, A. A. & Okafor, T. C. (2016). Deregulation of the foreign exchange market and its effect on industrial produce in Nigeria. *Global Media*

*Journal*, 1(7), 1–7.

Ikpesu, F. & Okpe, A. E. (2019). Capital Inflows, Exchange rate and Agricultural output in Nigeria. *Future Business Journal* 5(3), 1-8

Isibor, A., Olokoyo, F., Arogundade, M., Osuma, G. & Ndigwe, C. (2018). Exchange rate management and sectoral output performance. *International Journal of Supply Chain Management*, 7(5), 129–134.

Isola, L. A., Oluwafunke, A. I., Victor, A., & Asaleye, A. (2016). Exchange rate fluctuation and the Nigeria economic growth. *EuroEconomica*, 35(2), 127-142.

Iyeli, I. & Utting, C. (2017). Exchange rate volatility and economic growth in Nigeria. *International Journal of Economics, Commerce and Management*, 5(7), 583 – 595.

Iyeli, I. I., Nenbee, S. G. & Opue, J. A (2011). Exchange rate volatility and its effects on tradable goods in Nigeria annals of humanities and development studies. *Universal Academic Services*, Beijing, China, 3(2), 89–123.

Kalu, E. U., Ugwu, O. E., Ndubuaku, V. C. & Ifeoma, O. P. (2019). Exchange rate and foreign reserves interface: Empirical evidence from Nigeria. *The Economics and Finance Letter*, 6(1), 1-8.

Mahmood, I. & Ali, S. Z. (2011). Impact of exchange rate volatility on macroeconomic performance of Pakistan. *International Research Journal of Finance and Economics*, 64, 1450-2887.

Mlambo, C. (2020). Exchange rate and manufacturing sector performance in SACU states. *Cogent Business & Management*, 7(1), 1–16.

Mohamad, S. & Jusoff, K. (2008). Exchange rates and Export growth in Asian economies. *Asian Social Science*, 4(11), 30-36.

Obi, K. O., Oniore, J. O. & Nnadi, K. U. (2016). The impact of exchange rate regimes on economic growth in Nigeria. *Journal of Economics and Sustainable Development*, 7(12), 115-127.

Okorontah, C. F. (2016). Effects of exchange rate fluctuations on economic Growth of Nigeria. *International Journal of Innovative Finance and Economics Research*, 4(2), 1-7.

Oye, O, Lawal, I., Eneogu, A. & IseOlorunkanmi, J.



(2018). Does exchange rate devaluation affect agricultural output? Evidence from Nigeria. *Binus Business Review*, 9(2), 115-123.

Taiwo, J. N., Babajide, A. A., Okafor, T. C. & Isibor, A. A. (2016). Growth of Bank Fraud and its impact on the Nigerian Banking Industry. *Proceedings of the 28th International Business Information Management Association (IBIMA) Conference*, Seville, Spain, 2016.

Tulasombat, S., Bunchapattanasakda, C. & Ratanakomu, S. (2015). The Effect of Exchange Rates on Agricultural Goods for Export: A Case of Thailand. *Information Management and Business Review*, 7(1), 1-11

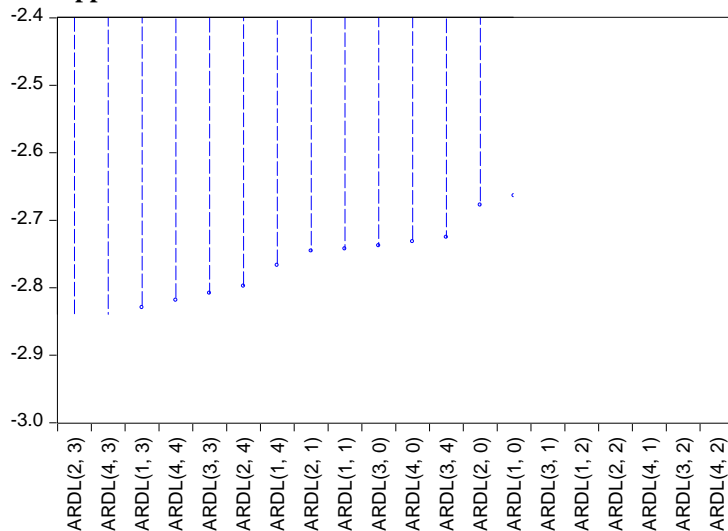
Udoh, E. J. (2018). Cointegration between exchange rate volatility and key macroeconomic fundamentals: Evidence from Nigeria. *Modern Economy*, 8, 846-855.

Ufoeze, L. O., Okuma, C. N., Nwahoby, C. & Alajekwu, U. B. (2018). Effect of foreign exchange rate fluctuations on Nigerian economy. *Annals of Spiru Haret University Economic Series*, 18(1), 105-122.

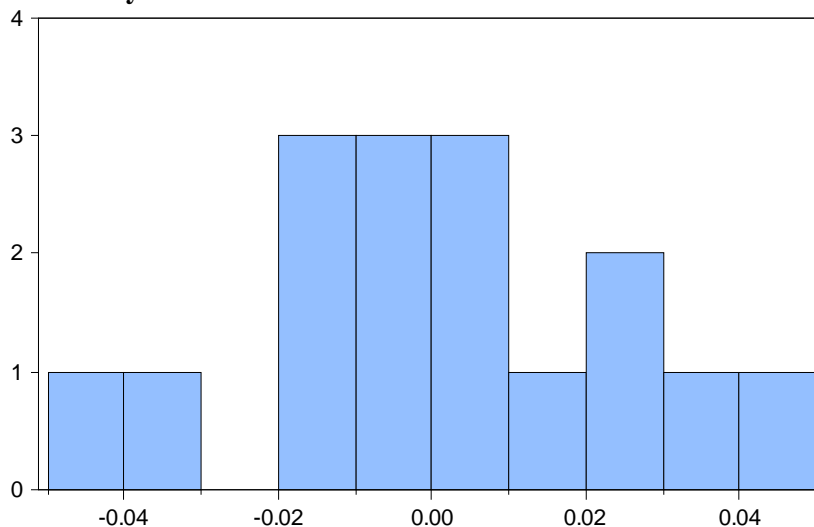
Wiseman, T., Luckstead, J. & Durand-Morat, A. (2021). Asymmetric Exchange rate pass through in Southeast Asian Rice Trade. *Journal of Agricultural and Applied Economics* 53, 341–374.

## APPENDICES

**Appendix 1**



**Appendix 2**  
**Normality Test**



Series: Residuals  
Sample 2004 2019  
Observations 16

Mean -3.29e-15  
Median -0.001599  
Maximum 0.041216  
Minimum -0.042750  
Std. Dev. 0.023078  
Skewness -0.010628  
Kurtosis 2.459543

Jarque-Bera 0.195030  
Probability 0.907089

**Source:** Author's Computation (Data from CBN Statistical Bulletin, 2021)

### Appendix 3

#### Breusch-Godfrey Serial Correlation LM Test

F-statistic	0.810661	Prob. F(2,5)	0.4955
Obs*R-squared	3.917822	Prob. Chi-Square(2)	0.1410

**Source:** Author's Computation (Data from CBN Statistical Bulletin, 2021)

### Appendix 4

#### Breusch-Pagan-Godfrey Heteroskedasticity Test

F-statistic	0.179498	Prob. F(8,7)	0.9863
Obs*R-squared	2.723542	Prob. Chi-Square(8)	0.9505
Scaled explained SS	0.380432	Prob. Chi-Square(8)	1.0000

**Source:** Author's Computation (Data from CBN Statistical Bulletin, 2021)

### Appendix 5

#### Ramsey Reset Test

Specification: AGDP AGDP(-1) AGDP(-2) AGDP(-3) AGDP(-4) EXCH  
EXCH(-1) EXCH(-2) INF C

Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.426696	6	0.6845
F-statistic	0.182070	(1, 6)	0.6845

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	0.000235	1	0.000235
Restricted SSR	0.007989	7	0.001141
Unrestricted SSR	0.007754	6	0.001292

**Source:** Author's Computation (Data from CBN Statistical Bulletin, 2021)



## Gandhian Philanthropic Approach Towards Society: Karma Café

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**Abstract:** This case study evolves the thought of deciphering Gandhinian thoughts amongst the youth. The case focuses on Gandhian principles & is then associated with the SERVQUAL model. It focuses on journey of an established entrepreneur Mr. Ketan Desais' to venture into a business idea with non conventional line of action. His conception of Karma Café and then further assimilation between (POP) Points of parity & Points of Differentiation (POD) towards the café industry from customers perspective.

### Research questions/Objective :

- 1) Which are the service aspects that can contribute to points of parity & points of difference, while establishing a new philanthropic service?
- 2) Which are the premises that distinguish between close competitors & distant competitors?

### Links to theory :

Gandhi and his principles are discussed with respect to corporate social responsibility in the most meaningful way. It is a perfectly followed laden activity. Gandhiji principles of Gandhi and philosophy weave in the corporate sector is the most value-driven activity. In world of technovation, relating thoughts of Mahatma Gandhi in realistic way is the most exigent. Relating Gandhi, a philanthropic aspect to the corporate world and evolve society towards the aspect of - Truth, Non-violence, Vegetarianism, Brahmacharya, Simplicity and Faith. To relate all this at corporate ground and develop a society based on code of ethics is the most demanding. Swierczek F. discussed (2007) "There is a shift in the role of business in society where societal, environmental and stakeholder value drivers could reshape the basis of economic competitive advantage". [1] This case study discussed that it would be challenging to set new parameter but with the constant efforts it would be possible to set the parameters. This case study focused on Gandhi and principles association with the SERVQUAL model which served society with values. As per Clifton K and Moura F. (2017) Latent demand - the activities and travel that are desired but unrealized because of constraints, have been historically examined from the standpoint of understanding the impacts of proposed capacity or service improvements on travel demand. [2]

### Phenomenon studied :

The case revolves around propagating Gandhian thought to the youth in a trendy setup of a cafe. Where reading and connection to Gandhi philosophy is evident. It also ponders about the stereotype definitions that the society follows for cafe and how a blend of a usual cafe is setup to deliver Gandhi's philosophy by the philanthropist Mr. Vivek Desai.



### **Findings :**

In this case Mr. Desai who felt people not able to recall Gandhian Philosophy not only was not able to connect it with the venture. He found there is no space for the artist where they can have their own spaciousness which embark on art. Mr. Desai found there was no such space available for youth which gave them encouragement for reading and utilization of technology too. For social betterment and healthy social mindset Reading is must. Cafe with reading a novel concept is also needed which is to give a new drive to youth towards reading and be able to associate them with Gandhian philanthropic aspect too. For a new direction it is indeed to develop thrust for the same. Mr. Desai who is an entrepreneur and keen to take such provocation.

### **Discussions**

This case enlightens on the SERVQUAL model which is not directly discussed in the case but in all discussion and detailing it is directly related to offer products and services in a metamorphosis way. This case study focuses on the laden activity where, a special space provided to the segmentation and able to provide a new sphere for buildout in a novel way. Not only that, but this case also focuses on the latent demand of the consumer's mindset relating to such a space which is within their affordable zone which is following the Philanthropic aspect of Gandhiji- PAG. How to give space to the segment, which is not beneficial or profitable, but which is indeed for society and follow PAG `` Art to be art must soothe "

**Keywords: Cafe, Entrepreneurship, Gandhian Thought Level of Competition, Philanthropist. ,**

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### **Introduction:**

It was early in the morning of February 2021, when Mr. Vivek Desai was reading an article in the newspaper about the up-trending cafe culture in Ahmedabad city & was thinking about cafes in Ahmedabad. He was also an owner of a so-called 'cafe'. A venture is very close to his heart but not to others.

### **Industry :**

A Café is a type of restaurant with variations of different cultures. British cafes and American diners were informal eateries offering a range of hot meals and made-to-order.

sandwiches or rolls. Most people have the misconception that cafés only serve coffee and other beverages but originally, they serve fully cooked meals with different combinations. Coffee Houses or cafés are not full restaurants. But for a much broader term, they can be termed as a type of restaurant with variations. businessmen innovate with different themes & explore the concept of cafes serving all types of cuisines to attract more customers. Ahmedabad houses more than 50 cafes in 2019, that were famous among youngsters and were a great hangout spot.

### **The entrepreneur:**

Mr. Desai, an entrepreneur, was successfully handling the illustrious Navjivan publication house. Navjivan Press was founded by Mahatma Gandhi in 1929. The word Navjivan means "a new life". He was associated with the printing house which is associated with Gandhian thought processes. For more than 50 years they were in the same business and maintained societal value and goodwill. A successful Venture of the publication house had all rights to publish books of National leader Gandhiji in his name. While he checked his half-yearly account in the month of October 2012, a huge profit figure seemed to give him a sense of achievement. He felt so good so shared this with his friend Sumit in a lighter tone " feel awesome" with the satisfactory work. During the conversation, Sumit reminded him about Sunday brunch where all friends with the family member were supposed to join. Mr. Desai and Sumit had decided to meet for brunch with family.

Mr. Desai called his wife- Shilpa, who had stomach pain since morning. Shilpa informed him that she was okay now and talked about household stuff. After a compilation of talks, Mr. Desai asked his secretary- Mr. Ninad called and confirmed his booking for Sunday brunch.

Mr. and Mrs. Desai always made it to go for morning walk. They preferred to walk at the Navjeevan Press premises. Mr. Desai used to go for walk at the Luxuriant greenery realm at Navjivan press, which is located at the center of Ahmedabad. It was also housed to employees of the press to their employees. They had about 30 quarters for the employees of different grades. Which had remained vacant for long.

One Sunday fine morning, in the month of November 2000 all friends with the family met at the pre-decided place. as it was brunch time there were few people & so the get together was enjoyed by all friends & family

Mr. Desai overheard a group of youngsters seated next to him. He named them “Youngistan” group. One fellow yelled and said why he gave this? And showed a book to friends. All his friends laughed out loud and said now you have to read. That fellow simply nodded “No”. Mr. Desai was shocked as the young boy refused to read “Experiments of Truth” the book which gave him inspiration and always guided him in odd circumstances. He felt disgusted and annoyed at the behavior of the Youngistan Group. All the members of youngistan group headed for refreshment and tea and the book was lying on the chair like an orphan. Mr. Desai's friends were discussing the economy, one of the friend's daughter's wedding, and other social and cultural issues. Only Shilpa (his wife) noticed that Mr. Desai has withdrawn himself mentally from the discussion and is feeling nostalgic about his favorite book in his hand.

Yongistan group members came with their refreshment - the plate was filled with samosa, chips, idli- poha- upma- sandwiches. The boy who yelled and refused to read the book came with a tray with more than 8-10 cups of tea and 4 of coffee and put it on a central table. Suddenly he saw that Mr. Desai was holding a book and turning off the pages. He joyed out of jump and took a big leap towards Mr. Desai and said ‘. Uncle thanks, I found a suitable person who could read the book. if you need you can have it.’ To this, he just smiled and asked the boys’ contact detail. Without asking anything, the boy wrote on the book's last page with Mr. Desai's pen and left. The boy did not even bother to inquire about why Mr. Desai needed his number and Shilpa was noticing everything. She was the sparkling star of the group; all the ladies and children asked her opinion for a wedding dress and demanded her designer number. She gave enough

attention to all but her mind was stuck with Mr. Desai. Mr. Desai went towards the washroom, so no one stopped him. He made his way towards the washroom and took a basement room and kept that book in his car and came back quietly.

Sunday brunch went proper, and all friends remained together till noon. In the evening in the easy chair Shilpasaw, Mr. Desai had a book in his hand which was given by that youngistan fellow. And he was so disappointed with the attitude of the fellow. He was disheartening. Shilpa knew his love for books and especially the Gandhian philosophical books. Vivek felt restless at being a founder of Navjivan Publication who has all rights of Gandhian Book publication not able to do some concrete work in the direction that the concept of Gandhiji reached till the youth in a real way and not limited to the books.

Shilpa asked him to be calm and not think much. And asked him to take a ride with her. Mr. Desai denied it and just sat in the easy chair with a different set of minds. Shilpa had to visit a cafe of her friend who gave an invitation to both. Shilpa tried to change the mood of Mr. Desai and asked him to join her for a change of mood and may it would give him a nourishing thought process. Mr. Desai just followed Shilpa, and both took their car. They reached the venue and met her friend. Shilpa greeted all her friends and Mr. Desai just nodded with a smile. Shilpa was too good at making connections and so Mr. Desai took a corner of the cafe. With a cup of coffee and some snacks he sat. He took a sip of coffee and ate like a ritual. In the second sip of coffee, he was ignited with a thought why not book with a coffee. Yes !!! Shilpa saw Mr. Desai was yelling at himself and she felt something must be wrong with him. She took a fast walk towards him and tried to calm him as his behavior was not acceptable at all.

Mr. Desai was so happy to have a thought and just danced with joy and held Shilpa from her shoulder and said yes, dear! I have my answer. Thank you, sweetheart. Shilpa asked him to keep calm and assured him to talk on the way home and Mr. Desai came to know that he was literally dancing. He was calm and sat on the chair and Shilpa came with a cup of coffee. He wished to discuss it with her, but she refused as she did not feel it was time to talk.



On the way home, Mr. Desai's eyes were effervescent. Vivek wished to share his idea but at the same time Shilpa felt stomach pain again and so Mr. Desai, not able to share his thoughts and mind, was diverted to the other side.

When they reached home, Mr. Desai asked her to go to bed and bring medicine for her. She felt so sorry as they had to discuss but due to her health, everything was messed up. Mr. Desai gave her medicine and asked her to sleep so she could feel good the next morning. But she felt restless the whole night and the next day when all reports came, they came to know she has typhoid.

Shilpa is not well, and Mr. Desai has to take care of her care and manage his office chores. Daily he was occupied with a lot of work - looking after household work, medicine for Shilpa and then went to the office and managed his shows. He felt how lucky he was as he had Shilpa with him. After a month she recovered well. She asked Mr. Desai that he should attend the publication fair which was held in Delhi which was beneficial for their business and forced him to go there as now she can take care of herself, home and be able to manage the office too.

Mr. Desai packed his language and also took some books in his handy bag. He went to his boarding house. He cleared all the formalities and waited for the launch. He stood for some refreshment and saw a cafe where he wished to sip coffee and wish to read his book. The sudden announcement gave him news that his flight was delayed by one hour due to a foggy atmosphere. So he has to sit for a long time in the cafe. He ordered coffee and snacks. He sat on a table and sat for his book. But due to the heavy crowd not able to concentrate and read. The waiter came with his coffee and snack which he ordered. suddenly flashed in his mind. And he recalled his idea of that night when they went to the cafeteria inaugural of Shilpa's friend. He hunched back. Just drank coffee, paid the bill, and came out of the terminal area. Called a rickshaw and went back home. Shilpa just started his evening dinner and saw from his kitchen window that one rickshaw came and who was that? Ohhh! Mr. Desai came? What happened? She just kept the utensil and rushed to the door. Mr. Desai just ran towards her and said: Yes, I wish to tell this for a long time. Finally today I hunched back so I took the next day's early morning flight. But it's a damn thing which I wish to discuss with you.

Shilpa was dumbstruck. She was not to figure out what he was telling her. Mr. Desai asked for water and she just signed the water bottle. Mr. Desai got that bottle and just pulled her on the swing and sat beside her. And asked her "Do you be with me in my next craziness?"

Shilpa nodded to know the next rollercoaster ride. Mr. Desai asked her you know that fellow who gave me that book so carelessly?" Shilpa is still not able to connect any loop or link. Mr. Desai went inside and bought that book and kept it in her hand. She realized now in which context Mr. Desai talked. He said I thought all about this but due to your health issue I was not able to talk with you. So today is D day.

### **The beginning of the cafe:**

It was Jan. 2015 in an adventure park Mr. Desai said "Listen, I wish to open a Gandhian Philanthropic Cafe". Shilpa missed the swing and just rolled on the floor. She was badly hurt and squawked loudly ohhh: I am hurt! Mr. Desai gave her support and settled her properly on the swing and he sat on a chair that was lying near the swing. Did he ask her ever visited any cafe which has books on the Gandhian philanthropic aspect? Shilpa nodded negatively. Vivek told her that we have a lot of space in our publication house so let us do something for our society and give our youth books free for reading at our space. Shilpa felt he sounded good and talked with a point. Mr. Desai stood inside and found a chalk stick and started drawing on the wall. Rough sketch of the premises and show what his vision is. Shilpa felt he was involved in this idea. He explained to her that in Ahmedabad there was no such space where people could read without paying a penny. Let us start a place where they got such an ambiance that gave them ease, space, and comfort. As an entrepreneur, he knows the nerve of the customer. But now he was working for his passion where his idea was to spread the uniqueness of Gandhian thought in the culture of Ahmedabad. Ahmedabad is the largest city in Gujarat state in India. It also houses the Internationally acclaimed Gandhi Ashram & Dandi Marg.

Shilpa listened to him quietly and started noting down all the points and asked Mr. Desai a very important thing: 'if your idea is so unique let me decide the menu of this cafeteria.' After almost 2 hours spent detailing his idea into a business idea. ed It was late in the evening that they



realized they needed to have something. Shilpa asked him what he wished to eat? Mr. Desai had no idea. So they both look at each other. Shilpa gave the healthiest & favorite options Khajoor Milk and Khakhra (roasted flattened bread). Both engrossed in their thoughts of the cafe & enjoyed the meal together. Mr. Desai had to go to Delhi the next morning, he called his agent and asked for the next day's ticket arrangement and ordered him to manage it anyways.

Mr. Desai left the next morning for the publication fair and asked Shilpa to make a perfect blueprint for the idea to execute as soon as possible. Shilpa knew that Mr. Desai was very involved in this thought and wished to fulfill it anyhow.

She settled a sheet with the questions.

1. What is the concept of the cafe?
2. Which sort of book does he wish to keep?
3. How will they manage this cafeteria?
4. How will they charge those who wish to sit?
5. What should be the timing?
6. What will be the expectations of visitors from the cafe?

She also visited her publication office to incorporate space in the premises so that the cafe can be incorporated. She called Mr. Kaushal - an architect and asked him to prepare a plan where they can develop a space for a cafeteria. But the basic condition is that enough space should be given to the sitting area and maintain decency for which they are known. She asked the publication house to make a list of all books they published and several copies in the warehouse. She also thought over the menu, but nothing was clicking. She prepared many items but when she remembered the thought of Mr. Desai, she turned on the next page and thought over the menu again which must be as unique as Mr. Desai's Idea.

She was so exhausted and ordered Tea while sipping some unique ideas that came to mind.

### **Pink Dairy :**

Shilpa drafted her ideas for the cafe and eagerly waited for Mr. Desai to come back from Delhi. After two days

when Mr. Desai came from the publication fair, he saw that Shilpa had worked hard to execute his idea. After routine stuff, Mr. Desai asked her to come to the office after lunchtime for discussion. Shilpa cooked food for them and packed his tiffin. Mr. Desai went to his office and Shilpa took her diary and started her own work.

After taking lunch, she headed to the office with her pink diary: which became the cornerstone of cafe planning. Prior to reaching the office of Navjivan press, Shilpa called the office and talked to the clerk whom she asked to prepare - stock of books in the warehouse. She reached the office and went to the clerk's office to collect the report and asked him to manage all records updated, Which She would require after a fortnight. They both sat in the office and Mr. Desai instructed the receptionist that no call should be transferred to him as he was busy in a meeting. Both had their working notes to discuss and Shilpa asked him several questions to make the idea into a successful venture.

### **The uniqueness of the Karma Cafe**

Did she ask him why this only? Mr. Desai was so confident and replied that no one wishes to work in a Gandhian philanthropic cafe. And because they were in the publication house business, they will manage the book for the reader free of cost. She questioned his idea and had reservations about the misuse or loss of books from their indigenous library.

Mr. Desai smiled and asked her 'why a person would take any book of Gandhian philosophy, if he followed Gandhi, would he do so?'

The main purpose of Mr. Desai was to give space to people to read books and there must not be any compulsion to pay. But how will this work? She questioned and here Mr. Desai told her that they should do something for society wholeheartedly. But Shilpa was not convinced.

Both were thinking and they agreed upon setting up a box near the book counter and those who aspired to pay would drop the amount in that box. Shilpa nodded in an affirmative note. At the same time, Mr. Desai looked at the watch. Their intense discussion went on for the last 90 minutes and he felt like having tea. Shilpa knew his wish and asked him to order tea for both. Mr. Desai ordered

that and at the same time, Shilpa took out her pink diary and turned the pages of the diary. Shilpa got the page on which she noted the menu. At the time the peon entered with tea. Mr. Desai took a glass of tea and gave it to her. He took his glass and Shilpa started enumerating the menu. When she said “Date Milk” Mr. Desai missed his sip of tea. And loudly said what? Date Milk in a cafe! Date milk in a Cafe! Mr. Desai drank tea like medicine and asked her again about the menu. She started detailing the list as if she was chanting mantras.

Date milk

0 Mint and coriander Juice

0 Coffee

0 Espresso coffee

0 Black tea

0 Masala milk

0 Turmeric and ginger milk

0 Thepla

0 Wheat bread pizza

0 Upma

0 Poha

0 Khakhra

0 Lemon juice

0 Sevmamra

0 Khaman

0 Dhokla

Mr. Desai had no words in his dictionary for the list. He asked her to rework the list. Shilpa gave him a list of more than 137 cafes that she had visited. She noted down all the cafe lists in her diary with the name and different types of menus from all over.

And as per Mr. Desais’ wish: the cafe should be based on traditional Gandhian philanthropy. Mr. Desai called up Kaushal, his friend who is also an architect.

Vivek asked Shilpa to allocate tasks to different team members and decide accountability for better cooperation and coordination of work.

Mr. Desai again resumed his press-related work and called his clerk with the file for discussion. He got engrossed in his work & left for home late in the evening.

Shilpa had reminded him of an art exhibition that was organized by one of their friends that evening.

He rushed to the home. & both got ready and made their way towards the art gallery. Mr. Desai met his friends from the school while Shilpa met her friends and then took a walk to the gallery to look at pictures. When Mr. Desai talked to his old school friend, he came to know that the friend was also an artist but due to lack of his own space was not able to focus on his artwork. The friend also inquired if Mr. Desai had some reasonably priced space where he can work peacefully & uninterruptedly.

Then they went to see the gallery. At the time of seeing the picture, Mr. Desai saw a picture having different cottages and how sun rays pass through all the cottages. And he got an idea to do something with the Gandhian cafe.

After compiling gallery art exhibitions and taking dinner with friends he asked all his friends whether artists faced some problems relating to their space. And all the artists there coherently replied shout ‘yes, We artists never get our own space, and the fact is that anyhow when we manage to work, we get disturbed from all the social domain and household work.’

One of the artists urged ‘I need only a cubic meter where I must not get any intervention because maintaining a link is tough.’

Way back home Mr. Desai kept quiet & was thinking about his cafe again. Later he went to the veranda and took a chalk stick in his hand and started writing the following on his favorite wall.

0 Art

0 Reading

0 Writing

0 Music

0 Singing

0 Painting

0 Drama

‘How can I provide space to those who need it?’ he murmured to himself and suddenly an idea ignited in his mind, he took his mobile and called up Kaushal.

The next morning, after a morning walk, when Mr. Desai

came back, he told Shilpa that today they both have to work towards finalizing the cafe. Vivek sounded eager and desperate for his cafe, which was felt by Shilpa.

Kaushal, the architect, asked him to make necessary changes to the office layout. The entrance where they have other offices asked to convert it in the cafe, where he specified, cafe with the reading table so that anyone can read at ease and utilized their laptop. He was instructed to incorporate open space for Shilpa's handicraft business, which was her dream project.

### **Shilpa was amazed.**

Mr. Desai took a diary in his hand and narrated his idea to Kaushal. He also told him to kindly make an art gallery that connects the office & Shilpa's handloom space and cafe all together so people can explore everything in a decent manner.

He asked Shilpa to come with him. Then Mr. Desai took them to the residential plot area, which was allocated to workers of the press previously. Mr. Kaushal and Shilpa did not have any idea.

And then he explained that he wished the area should be given to the artist for the development of their thought process and creativity. And asked Kaushalbai to make it ready so that aspiring artists can use this place.

He looked towards Shilpa and informed her that the palace would be given for art development: To painter, musician, composers, writers, readers, etc. anybody who wishes to do some quality work. He decided to give needful instruction & 'till the end of 2014 the dream project was completed. Shilpa froze with the detailing of Mr. Desai. Kaushalbai was given a deadline of six months to renovate the space & being inaugurated by December 2018.

Mr. Desai took a personal interest in everything. Till then Shilpa also explored different cafes in the city and identified different menus which would add more color to their project. It was surprising for both that their thought from paper to contrive took almost one and half years. And finally, the most important thing was the 'brand name of the cafe.' They both were searching since the day of inception and discovered many Sanskrit words, many Arabian words, French, Italian, and so on. But none of the words matched their

aspirations/expectations. And in all that frustration Vivek took a book titled "experiment of truth" and started reading it. He finished almost half the book within two days and suddenly in the discussion he asked Shilpa that the cafe should represent Gandhian philosophy & thus the name should also reflect the philosophy of Bapu. and both different names clicked in their mind and with a regressive exercised reach till the name " KARMA CAFE".

On 30th Jan. 2015 - Shahid Divas of Bapu, the cafe was launched through major newspapers in the city. It was captioned as " Karma Cafe: A cafe without charge".

Mr. Deasi decided that as the cafe majorly serves the aspirant for study, beverages and food items were free of cost. Those who wish to pay something then they could drop an amount in the box which is lying near the order table.

This concept amused people, 'a cafe without charge' shocking. Mr. and Mrs. Desai spread this through their Facebook account so that those who were in contact and those who refer to the city highlight daily notice Karma Cafe.

### **Connecting Dots.**

Absolutely a horizon was explored when along with the cafe, spare space was to be given to artists for their artwork on a first come first basis for a stipulated time frame. Shilpa also suggested that it would be better to be associated with some art school where students who were in search of such a place can explore the cafe & art space. This suggestion was accepted by Mr. Desai. They both agreed on one thing that 'they will not charge anything instead of this the artist will have to give them anyone picture as a memory to the cafe.

On 1st July 2017, GST- good and service tax was implemented in India by the Government of India.

After this once announced, Mr. Desai's legal advisor advised him that they must start pricing their Menu as it is compulsory.

Karma cafe also organized different art-related activities on each Saturday they organized " ShaniSabha " where Gujarati literature lovers would come and join.

In the same year, Mr. Desai had a meeting at Sabarmati

Jail with some social activists who wished to bring change in prisoners. When they continued with their meeting one of the prisoners sang lines of a song. At the same time Jailor also told Mr. Desai that many prisoners sing well that every morning that group manages prayers. Jailor asked him directly if he can give them a platform so they can exhibit their art outside this prison? Mr. Desai asked him to give some time so if he can do it he would like to do something for the prisoner.

He discussed the idea with social activists and some lawyers for the same. every Weekend when they served Gandhi Thali, the group of prisoners was scheduled for a song performance. For prisoners, they also provided the space to exhibit their art of idol making at the time of Ganesh Chaturthi and kept some idols in the showcase so if anyone wishes to purchase, they can purchase them. Karma cafe also organized different workshops for writing, film drama, Skits, and poetry.

The art gallery part was also given to the artist at a reasonable cost which is affordable to them and different art exhibitions were held.

Shilpa also started her handloom store named “ Satvah” which promoted Khadi and Handloom - handicraft

crafted items. Karma followed pure Gandhian Philosophy focused on self-sustain growth with art and cultural development.

For better development of Karma with the advice of Ramsang Mori Mr. and Mrs. Desai also started now there youtube channel which provided information on Karma cafe in detail to attract more customers. Desai was concerned about the comparison of Karma cafe with others by youngsters & whether his venture would be able to teach Gandhinian philosophy to visitors?

### **References:**

- [1] Swierczek F. “, Societal, Environmental and Stakeholder Value Drivers: A Case Analysis of US and Asian International Firms”<https://doi.org/10.1177/097168580701300205>
- [2] Clifton K., Moura F. (2017) “A Conceptual Framework For Understanding Latent Demand: Accounting For Unrealized Activities And Travel”[3]<https://www.facebook.com/karmacafe.navajivantrust/>



## Detecting negative attrition using predictive analytics

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**Abstract:** Employee attrition is a significant problem in companies, precisely when trained, technical and efficient employees leave for unknown reasons. Employee leaving an organization creates a void and spawns an environment where other employees also start to think in the same line. Therefore, companies should predict the reasons for negative attrition and motivate them to continue by making slight adjustments. Using a sample ( $n=1470$ ) from the IBM dataset, this study considers the role that company characteristics (Business Travel, Daily Rate, Department), workforce characteristics (Environment Satisfaction, Job Involvement, Job Level, Job Role, Job Satisfaction, Relationship Satisfaction), and employee benefits (Stock Option Level, Training Times Last Year, Work Life Balance, Percent Salary Hike, Monthly Income, Performance Rating) practices have in clarifying negative attrition. The goal of the study is to recognize the causes for negative attrition based on objective data analysis. By doing so, the predictive model helps in identifying the causes of negative attrition and also to predict which employee will leave the company. After training 70% of the IBM dataset, results are given using three accuracy standards – classification accuracy, precision, and recall. The predictive model that produced the best results for the remaining 30% of the test dataset is the neural networks model. It reveals the best classification accuracy (0.839), precision (0.824), and recall (0.839).

**Keywords:** Neural Network, Confusion Matrix, Negative employee attrition, CRISP-DM framework, predictive models.

### 1. Introduction

Employee attrition distresses both high and low performers alike. There are two sides to employee attrition: positive and negative (Flowers & Hughes, 1973). Positive attrition occurs when low-performing workers leave the company. In contrast, negative attrition happens when top-performing employees become demotivated and exit (Samuel & Chipunza, 2009). Negative attrition is a grave problem and, if not handled well, results in more significant employee turnover (Davidescu et al., 2020; Yedida et al., 2018).

Companies are adopting several strategies to ease negative attrition, employee referrals (Khalid & Nawab, 2018), financial support for higher education (Johnson & Gueuta, 2019; Towns, 2019), flexible working hours (Golden, 2003), or allowing employees to work from home (Bloom, 2014). However, even with a judicious mix of these strategies, the companies find it challenging to control negative attrition.

This work aims to analyze how objective factors cause negative attrition and recognize the notable causes of an employee's decision to leave a company. After the training, 70% of the dataset, the obtained model tests is for the remaining 30% for predicting employees' negative attrition. Results are stated in terms of accuracy standards for the predictive models that produced the best results. In companies where employees perform particular tasks, employee continuity becomes essential; thus, the role of predictive models to identify negative attrition becomes an indispensable constituent (Khera & Divya, 2019). Furthermore, predictive models allow companies to transform data into meaningful information by using historical data to predict the causes for negative attrition (Jhaver et al., 2019; Ray & Sanyal, 2019).

In this paper, we analyze the reasons for negative attrition by identifying the variables that impact them and then propose the best predictive model based on the statistical evaluation of data. First, the study analyzes the data with



24 features (after removing 11 dormant variables) using selected predictive models. Then, the results are expressed using a neural network in three accuracy standards – classification accuracy, precision, and recall. The results obtained from the analysis demonstrate the adoption of a predictive model to identify negative attrition with causes.

The rest of the paper is organized as follows; In Section 2, the research methodology is discussed, presenting business understanding, data understanding, and data preparation for analysis. Section 3 is dedicated to data modelling, which illustrates the model construction phase and executed predictive model. In Section 4, we present the analysis results, comparing using accuracy standards of the proposed models. The outcome deployment is mentioned in section 5, which gives the outcome based on the neural network for 30% of the test data. Finally, in Section 6, conclusions are drawn.

## 2. Research Methodology

The research methodology used in this work is based on the CRISP-DM framework, which stands for Cross-Industry Standard Process for Data Mining. It also includes methods for data analysis, which is the empirical data analysis process, as well as an adaptive and progressive machine learning technique that provides predictive analytical solutions as well as efficient and accurate implementations. The CRISP-DM architecture includes a process model for designing, developing, constructing, testing, and deploying predictive models (Rodrigues, 2020). The secondary dataset used for the study is an open source data available on Kaggle from IBM (IBM Dataset, 2019).

The CRISP-DM approach is applied to select the best predictive model for identifying negative attrition with the following phases:

1. **Business understanding:** The understanding of the research objectives (section 2.1)
2. **Data understanding:** Collect the employee dataset, which consists of current and past employee observations. The data understanding includes identify dormant variables and conduct descriptive analysis to determine the distribution of

data for the dependent variable(section 2.2)

3. **Data preparation for predictive modeling:** Data preparation involves data cleaning to prepare the final dataset (section 2.3)
4. **Data modeling:**Data modeling elaborate the dataset for training and testing to be used by predictive models for analysis (section 3)
5. **Results evaluation:** The results are evaluated based on different performance metrics and select the best fit model that gives the most accurate results for the given problem (section 4).
6. **Outcome deployment:** Use the best-fit model for predicting the negative attrition and identify the reasons for employees leaving the job (section 5).

### 2.1 Business Understanding

The research objectives for the study identifies the business understanding for the case. There are two research objectives:

- i. to use predictive models for negative attrition based on company characteristics, workforce characteristics, and employee benefits,
- ii. to evaluate the effectiveness of different predictive models based on their predictive accuracy.

### 2.2 Data Understanding

IBM disseminates the open source dataset used in this research work (IBM Dataset, 2019), which is available on Kaggle. This dataset contains 35 features relating to 1470 observations.

#### 2.2.1 Identifying Dormant variables

It was observed from the dataset that some variables played a minor role, termed dormant variables, and is not required for the prediction of negative attrition. Thus, the number of variables reduced from 35 features to 24 features (see figure1).



**Figure1: Dormant variables (Source: IBM Dataset, 2019)**

EmployeeCount  
EmployeeNumber  
Monthly Rate  
Num Companies Worked  
Over18  
Standard Hours  
Total Working Years  
Years At Company  
Years In Current Role

Years Since Last Promotion

Years With Curr Manager

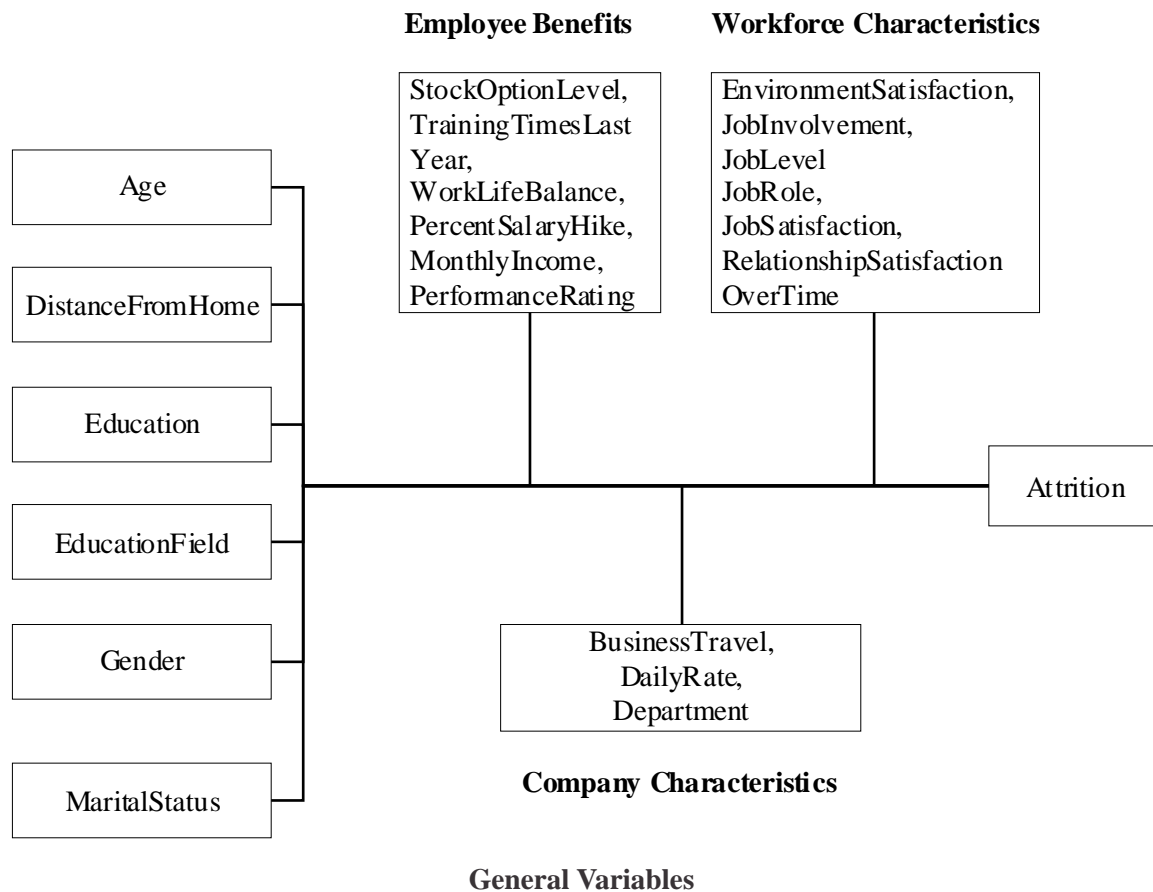
Thus the independent and dependent variable list is shown in table 1:

The dependent variable, attrition, identifies “No” when an employee did not leave the company and “Yes” when an employee left the company.

The variables Age, Distance From Home, Education, Education Field, Gender, and Marital Status are categorized as general variables (see Figure 2).

**Table 1: Dataset (Source: IBM Dataset, 2019)**

Independent Variables			Dependent Variable
Company Characteristics	Workforce Characteristics	Employee Benefits	Attrition
Business Travel, Daily Rate, Department	Environment Satisfaction, Job Involvement, Job Level Job Role, Job Satisfaction, Relationship Satisfaction	Stock Option Level, Training Times Last Year, Work Life Balance, Percent Salary Hike, Monthly Income, Performance Rating	
Other variables: Age, <u>DistanceFromHome</u> , Education, <u>EducationField</u> , Gender, <u>MaritalStatus</u>			

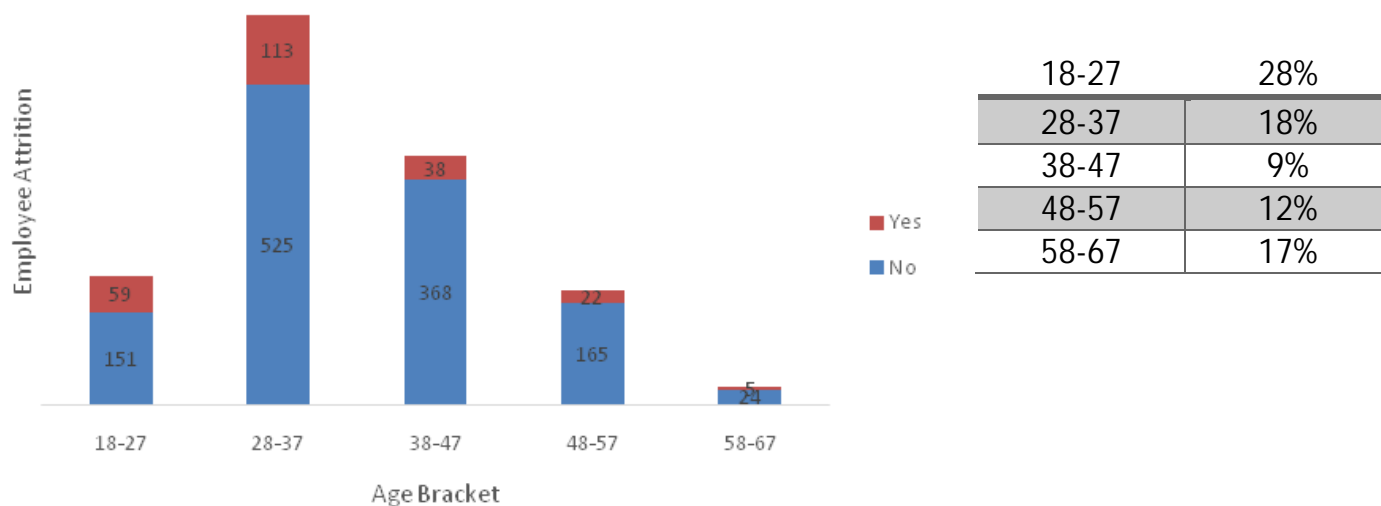


**Figure 2: Variables for recognizing negative attrition**

### 2.2.1 Descriptive Analysis for general variables

Descriptive Analysis aids in observing the distribution of the target variable in the dataset. As given in Figure 2,

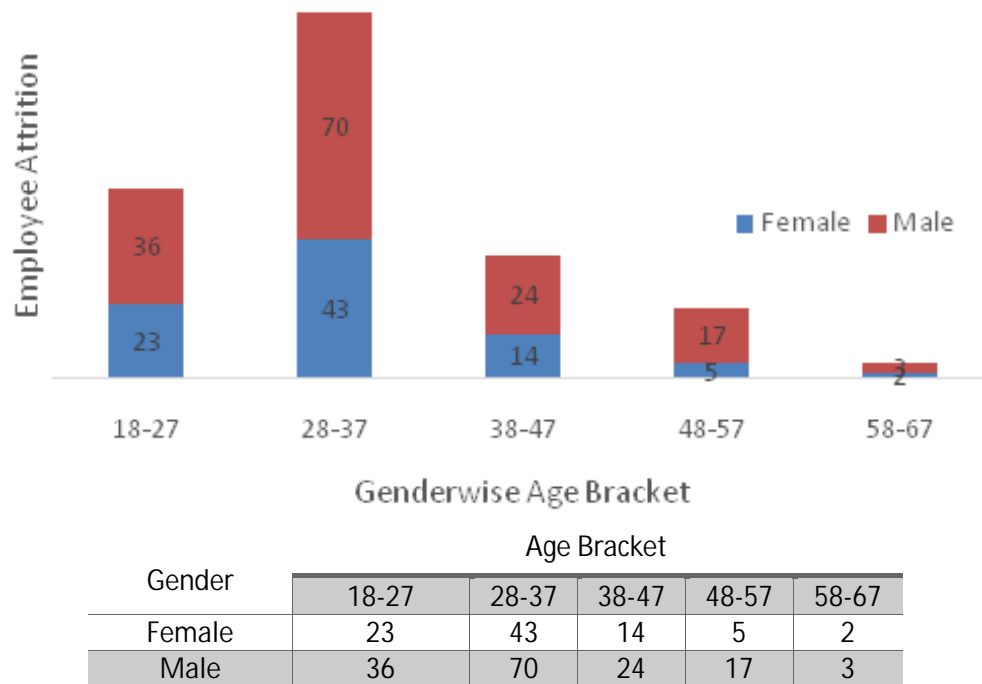
28% of employees between the age bracket of 18-27 left their jobs. The number decreases as we progress through age.



**Figure 3: Distribution of negative attrition by Age Bracket**

Interestingly, gender-wise, negative attrition is higher in the age bracket of 28-37 for females and males with 49% and 47%, respectively. Overall, 15% and 17% female

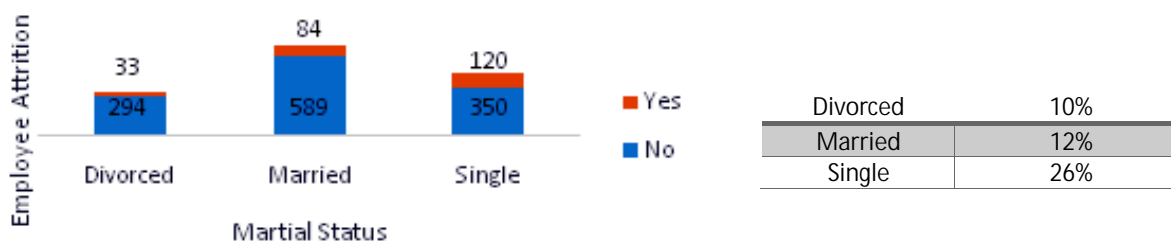
and male left the jobs. As mentioned in Figure 4, the effect of negative attrition drops in both genders as we headway through age.



**Figure 4: Distribution of negative attrition Gender and Age wise**

The table in Figure 5 shows that negative attrition on single employees is highest, with 26%. Married and

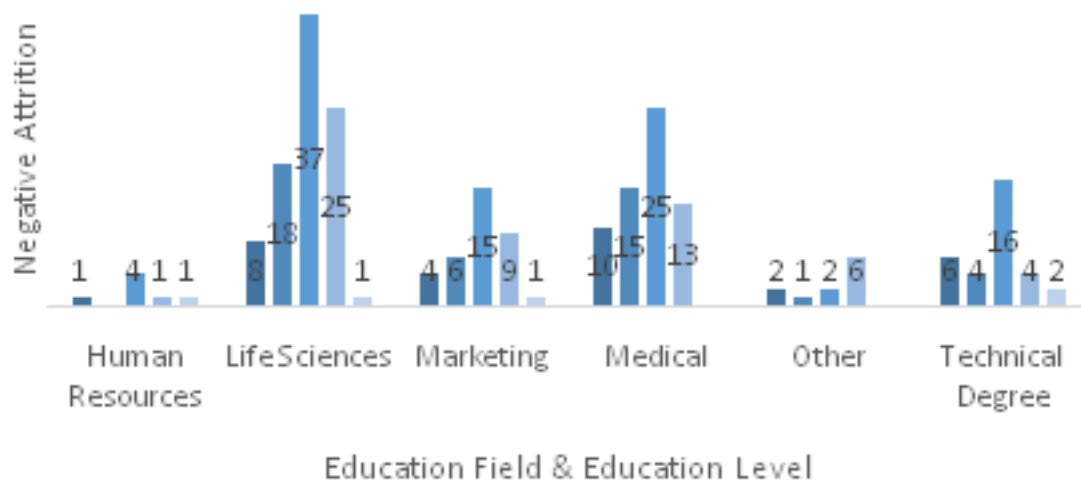
Divorced have a negative attrition rate of 12% and 10%, respectively.



**Figure 5: Distribution of negative attrition by marital status**

In figure 6, we reported the negative attrition as a function of the education field and education level. The dataset has six education field, Human Resources, Life Sciences, Marketing, Medical, Technical degree, and Others. The education level for each education field is divided into five groups, with 1 specifies basic qualification and 5, the highest qualification. The observation of the dataset is that the employees with a qualification in human resources and technical degree

incline to be the significant contributor to negative attrition with 26% and 24%, respectively. Employees with education in life sciences and medical possess a negative attrition rate of 15% and 14%. It is also witnessed from figure 6 that employees with education levels 1, 2, 3 and 4 are the highest contributor to negative attrition with 18%, 16%, 17%, and 15%. An employee with the highest education level 5 only contributes to 10% of negative attrition.

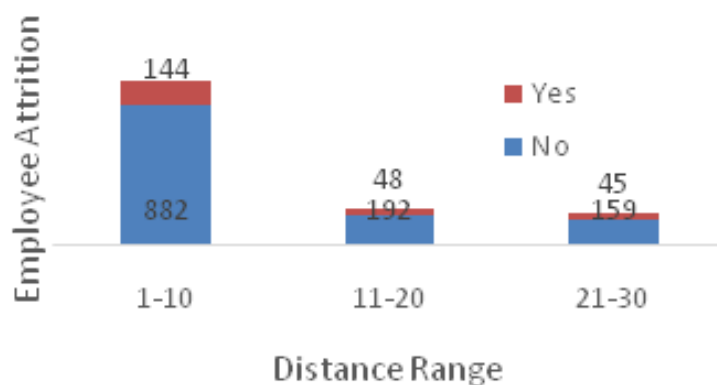


Education Field	Education Level				
	1	2	3	4	5
Human Resources	1	0	4	1	1
Life Sciences	8	18	37	25	1
Marketing	4	6	15	9	1
Medical	10	15	25	13	0
Other	2	1	2	6	0
Technical Degree	6	4	16	4	2

Figure 6: Distribution of Education Field and Education Level

From figure 7, it is detected that as the distance between home and company increases, there is an upsurge in employees leaving the company. Results in Figure 6 show that the percentages of negative attrition within the

clusters vary significantly (i.e., between 14% and 22%). On the contrary, it can be noted that employees living far from a company leave the job.



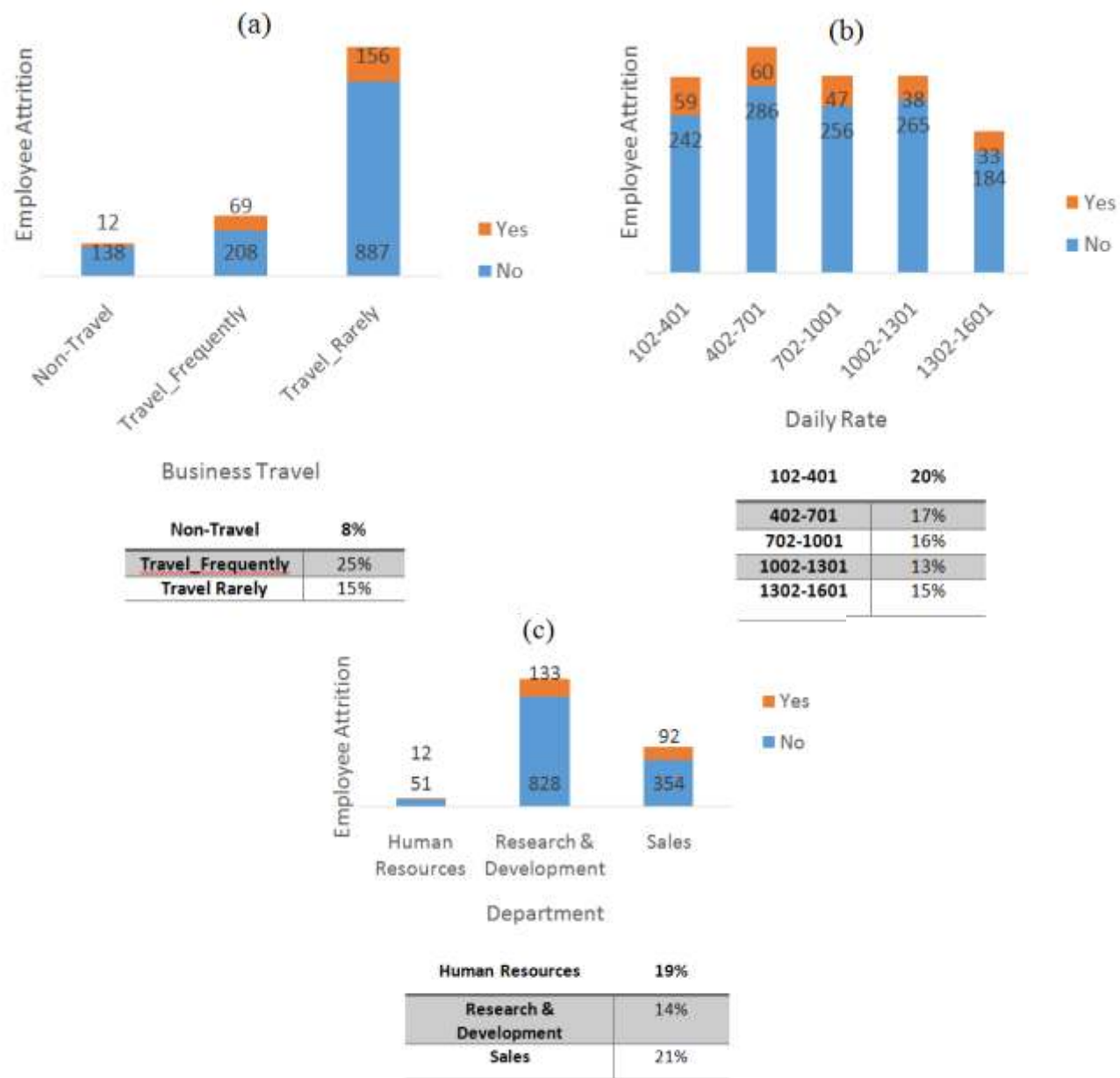
1-10	14%
11-20	20%
21-30	22%

Figure 7: Distribution of negative attrition by distance from home

### 2.2.2 Descriptive Analysis for company characteristics

In figure 8, we reported the negative attrition as a function of company characteristics. For business travel, the highest effect of negative attrition is for employees who frequently travel, with 25% of the employee. Figure 8(a) shows that the percentages of negative attrition for employees who do not travel or rarely travel as 8% and 15%, respectively. Figure 8 (b) mentions that for a daily

rate, 20% of employees with the lowest daily rate between the range 102-401 tend to leave the job frequently. Employees with other daily rates (402-701, 702-1001, 1002-1301, 1302-1601) fall between 13% to 17%. Finally, figure 7(c) shows that the impact of negative attrition on human resource employees, research & development and sales are 19%, 14% and 21%, respectively.



**Figure 8: Distribution of negative attrition for company characteristics: (a)Business Travel (b)Daily Rate and (c) Departments**

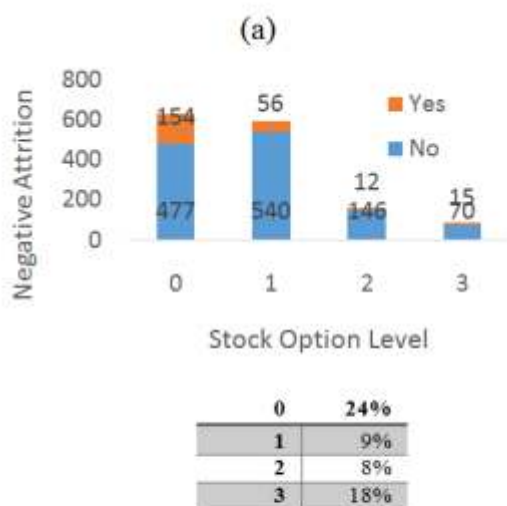




**Figure 9:** Distribution of negative attrition for workforce characteristics: (a) Job Satisfaction (b) Job Involvement (c) Employee Satisfaction (d) Job Level (e) Job Role and (f) Relationship Satisfaction (g) Overtime

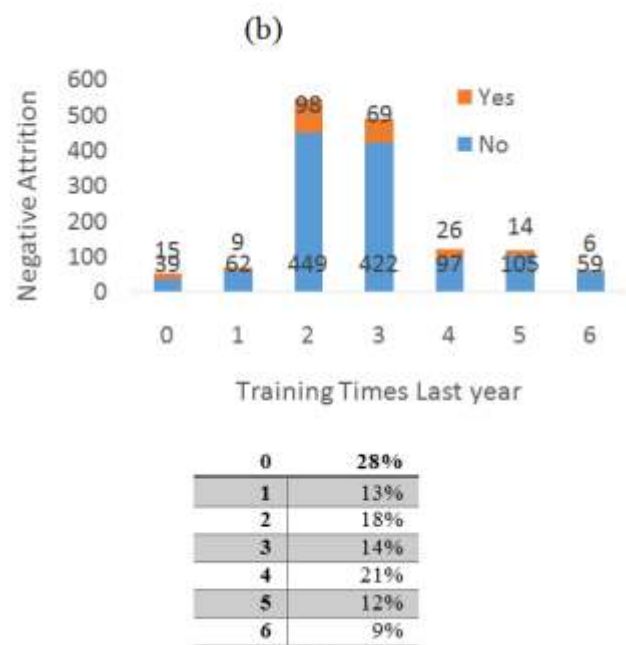
### 2.2.3 Descriptive Analysis for workforce characteristics

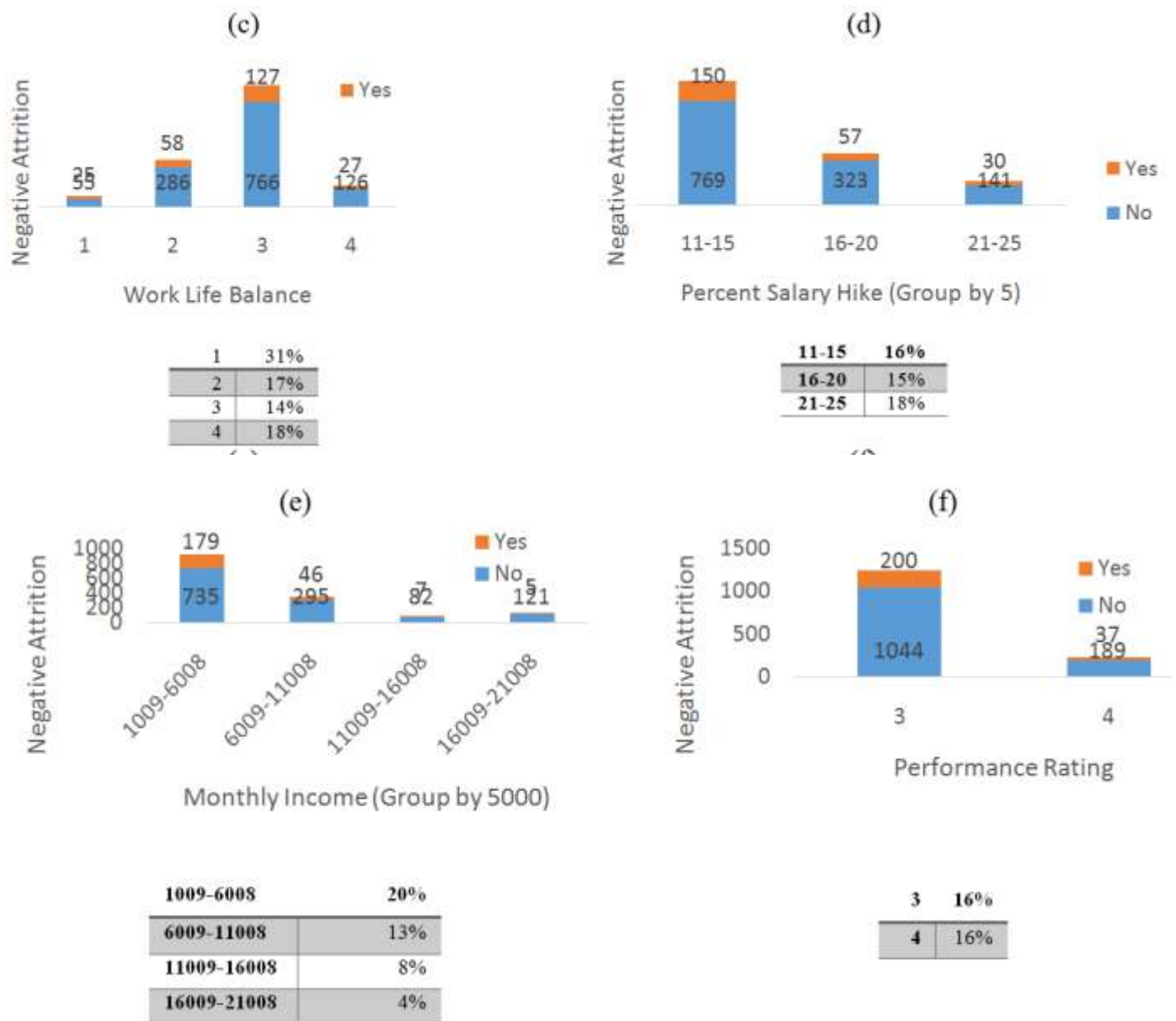
Figure 9 shows the distribution of workforce characteristics on negative attrition. Concerning job satisfaction, an employee with job satisfaction 1 (1 being lowest and 4 the highest) is 23%. Employee with job satisfaction 2, 3 and 4 are 16%, 17% and 11% respectively (figure 9(a)). The result shows that the employee's job involvement in the processes or tasks of the company is the most influential factor for attrition. It is noticed that 34% of the employee with low job involvement results in negative attrition (figure 9(b)). It is also observed that one-fourth (25%) of the employees leave with low environment satisfaction (figure 9(c)). Employees with job level 1 (1 being lowest and 5 the highest) have the highest negative attrition rate of 26% (figure 9(d)). For the job role, the sales representative leave the job with 40% negative attrition, human resources and laboratory technician with 23% and 24%, respectively (figure 9(e)). Relationship satisfaction shows the relationship of employees with other employees and its effect on negative attrition. It is observed that employee with low relationship satisfaction tends to leave the company with 21% (figure 9(f)). It is also witnessed that almost one-third of employees leave who work overtime with negative attrition of 31% (figure 9(g)).



### 2.2.4 Descriptive Analysis for employee characteristics

Figure 10 shows the distribution of negative attrition based on different attributes of employee characteristics. Almost one-fourth of employees with 0 stock option leave the job in comparison to an employee with a high stock option (1,2 and 3) (figure 10(a)). Employees with low training have a high impact of negative attrition (28% with 0 training left the job) than an employee with more training. The negative attrition is lowest (9%) with six training (figure 10(b)). The attrition rate is evenly balanced between employees who left the company and those still in service (figure 10(c)). Among workers with low work-life balance, attrition is over 30%, while employees who did not work overtime have an attrition rate between 14% and 18%. The per cent salary hike is divided into three categories, grouped by 5. The negative attrition per cent salary hike is equally distributed between the groups (figure 10(d)). The monthly income is divided into 4 clusters with four groups, each separated by 5000. Employees with low monthly incomes between 1000-6000 saw the maximum negative attrition of 20% (figure 10(e)). Though the performance rating ranged from 1 to 5, 1 being lowest and five the highest, the employee rated 3 and 4 respectively. The negative attrition for performance ratings 3 and 4 is equally divided by 16% (figure 10(f)).





**Figure10:** Distribution of negative attrition for employee characteristics: (a) Stock Options Level (b) Training Times Last Year (c) Work-Life Balance (d) Percent Salary Hike (Group by 5) (e) Monthly Income (Group by 5000) and (f) Performance Rating

### 2.3 Data preparation for predictive modeling

Data preparation is one of the most imperative aspects of predictive modeling. Data preparation for the study was conducted in two parts, removing dormant variables and mapping textual values to numeric values.

The original dataset contained several variables with textual values and needs to be transformed to numeric values for in-depth analysis. Also, we need to outline the range for the numeric values for classification (see table 2).

**Table 2: Variables transformation**

Variable Name	Variable type	Transformation
BusinessTravel	Text	Text to Numeric Value Non-Travel to 0, Travel_Rarely to 1, Travel_frequently to 2
DailyRate	Numeric	Numeric to Range, Group by 300, Starting at 102, Ending at 1601 [102-401, 402-701, 702-1001, 1002-1301, 1302-1601]
Department	Text	Text to Numeric Human Resource to 1, Research & development to 2, Sales to 3
MonthlyIncome	Numeric	Numeric to Range, Group by 3000, Starting at 1009, Ending at 22008 [1009-4008, 4009-7008, 7009-10008, 10009-13008, 13009-16008, 16009-19008, 19009-22008]
PercentSalaryHike	Numeric	Numeric to Range, Group by 5, Starting at 11, Ending at 25 [11-15, 16-20, 21-25]
JobRole	Text	Text to Numeric value Healthcare Representative to 1, Human Resource to 2, Laboratory Technician to 3, Manager to 4, Manufacturing Director to 5, Research Director to 6, Research Scientist to 7, Sales Executive to 8, Sales Representative to 9

### 3. Data Modelling

The data modeling process consists of selecting predictive models based on various machine learning techniques used in the experimentation. Different predictive models were used, such as those found on a support vector machine (SVM), random forest, naïve Bayes, and neural network. The aim is to recognize the preeminent classifier for the analyzed problem. Thus, each classifier must be trained on the featured set and the classifier with the best classification results for prediction.

The classifier evaluation is based on four different accuracy standards from the confusion matrix:

- 1) The employee did not leave the job, and the predictive algorithm predicts it correctly (Actual  $\rightarrow$ 0, Predicted  $\rightarrow$ 0, termed as True Negative (TN))

- 2) The employee did not leave the job, and the predictive algorithm wrongly predicts that the employee left the job (Actual  $\rightarrow$ 0, Predicted  $\rightarrow$ 1, termed as False Positive (FP))
- 3) The employee left the job, and the predictive algorithm predicts it correctly (Actual  $\rightarrow$ 1, Predicted  $\rightarrow$ 1, termed as True Positive (TP))
- 4) The employee left the job, and the predictive algorithm wrongly predicts that the employee did not leave the job (Actual  $\rightarrow$ 1, Predicted  $\rightarrow$ 0, termed as False Negative (FN))

The accuracy standards from the confusion matrix are classification accuracy, precision, and recall (see table 3)

Table 3: Accuracy Standard to evaluate predictive models

Accuracy Standard	Evaluation Criteria
<p>Classification Accuracy: It is the ratio of the number of correct predictions from total data points.</p> $\text{Classification Accuracy} = \frac{TP + TN}{TP + TN + FP + FN}$	Classification Accuracy > 0.5
<p>Precision: Precision is the ratio between the True Positives (TP) and all the positives.</p> $\text{Precision} = \frac{TP}{TP + FP}$	Precision > 0.5
<p>Recall: Recall is the measure of our model correctly identifying True Positives (TP).</p> $\text{Recall} = \frac{TP}{TP + FN}$	Recall > 0.5

As two dedicated datasets were not available, the original dataset is separated into two parts with 70:30 ratios, 70% used for training and the remaining 30% used for testing (see Figure 11).

All the predictive models were trained with 70% of datasets, which is 1029 observations. The test set contains the remaining 30% (441 observations) to evaluate the general performance of the models using a confusion matrix.

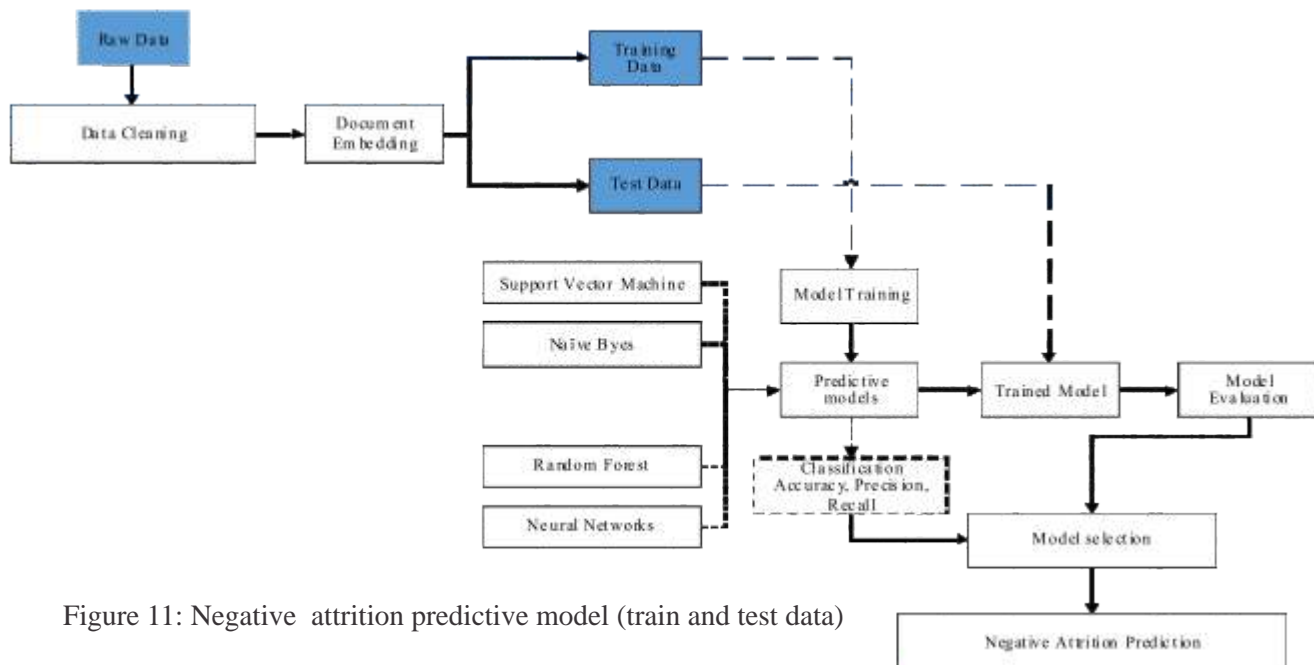


Figure 11: Negative attrition predictive model (train and test data)

#### 4. Results evaluation

This stage evaluated the accuracy of the adopted models. The results of the decisions made in the data modeling phase were collected for each of the predictive models. The results are evaluated using a confusion matrix, where the values for each of the proposed predictive

models are shown.

To proceed with the performance evaluation, we derive a series of fundamental metrics to quantitatively express the proficiency of each model: classification accuracy, precision, and recall. Table 4 summarizes the outcomes.



**Table 4: Performance metrics of proposed predictive models**

<b>Predictive models</b>	<b>Classification accuracy</b>	<b>Precision</b>	<b>Recall</b>
SVM	0.911	0.908	0.911
Random Forest	0.965	0.966	0.965
Neural Network	1.000	1.000	1.000
NaiveBayes	0.812	0.841	0.803

We are concerned with forecasting the number of employees who could leave the company by minimizing the number of false negatives.

## 5. Outcomes deployment

As mentioned in table 4, the neural network was recognized as the best predictive model to accomplish the objective of the analysis. In table 5, we testified the confusion matrix of the neural network predictive model. The neural network predictive model acceptably classified 370 out of 441 instances.

**Table 5: Neural Network predictive model outcomes for test data**

	<b>Classification accuracy</b>	<b>Precision</b>	<b>Recall</b>
Neural Network	0.839	0.824	0.839

### Neural Network model obtained:

- The lowest false positive rate of approximately 7.3%. It only failed to detect 27 employees who had left the company, getting the best recall score of 0.839;
- The true positive rate of approximately 38.03%, correctly predicting 27 out of 71 workers who left the company;

The neural network model also identified the top-ranked variables, which means they contribute the most to the dependent variable. So, as we are trying to find why an employee leaves the job, we keep the value of the dependent variable attrition=yes (see table 6).

The highest-ranked variable is “OverTime” (with 32% and 17%, respectively), indicating the maximum impact on the negative attrition prediction. The variable “Work Life Balance” also has a high effect on negative attrition with 25%. “Education” and “Training Times Last Year” also plays a substantial role in negative attrition.

**Table 6: Why employee leave the job**

<b>Variables (attrition=yes)</b>	<b>Likely to leave</b>
JobRole=Research Director	9%
Department=Human Resources	11%
EducationField=Other	11%
MaritalStatus=Single	15%
TrainingTimesLastYear	16%
Education	17%
OverTime=No	17%
WorkLifeBalance	25%
OverTime=Yes	32%

### Conclusion

The study tried to provide reasons for an employee quitting the job:

- What are the variables that indicate that an employee will leave the company?
- What is the most suitable predictive model to identify the negative attrition?

- Which amongst to identify the company, workforce, and employee benefits factors that result in negative attrition?

To this aim, we applied four predictive models to recognize the factors that may contribute to an employee leaving the company. First, we did the descriptive analysis to identify the impact of independent variables on the dependent variable, attrition. Then, a descriptive study for three categories of moderating variables, company characteristics, workforce characteristics, and employee benefits, was conducted to identify the impact on attrition.

The dataset was processed, separating it into the training and the test, assuring the similar distribution of the target variable. We selected various predictive models (SVM, Random Forest, Neural Network and NaiveBayes), and for each of them, we conceded out the training and validation phases. To evaluate the performance, the predicted results were collected and nurtured into the confusion matrices. From these it was possible to calculate the basic metrics necessary for an overall evaluation (classification accuracy, precision and recall) and to identify the most appropriate predictive model to forecast whether an employee was likely to leave the company. The algorithm that produced the best results for the available dataset was the neural network predictive model: it revealed the best recall rate (0.839), and achieved an overall false negative rate equal to 7.3% of the total observations. Results obtained by the proposed predictive models demonstrate that the main negative attrition variables are JobRole=Research Director, Department=Human Resources, EducationField=Other, MaritalStatus=Single, TrainingTimesLastYear, Education, OverTime=No, WorkLifeBalance, and OverTime=Yes.

## References

Bloom, N. (2014). To Raise Productivity, Let More Employees Work from Home. *Harvard Business Review*. <https://hbr.org/2014/01/to-raise-productivity-let-more-employees-work-from-home>

Davidescu, A. A., Apostu, S.-A., Paul, A., & Casuneanu, I. (2020). Work Flexibility, Job Satisfaction, and Job Performance among Romanian

Employees—Implications for Sustainable Human Resource Management. *Sustainability*, 12(15), 6086. <https://doi.org/10.3390/su12156086>

Flowers, V. S., & Hughes, C. L. (1973). Why Employees Stay. *Harvard Business Review*. <https://hbr.org/1973/07/why-employees-stay>

Golden, L. (2003). Flexible Work Schedules and Their Impact on Employees. In A. Sagie, S. Stashevsky, & M. Koslowsky (Eds.), *Misbehaviour and Dysfunctional Attitudes in Organizations* (pp. 122–137). Palgrave Macmillan UK. [https://doi.org/10.1057/9780230288829\\_7](https://doi.org/10.1057/9780230288829_7)

Jhaver, M., Gupta, Y., & Mishra, A. K. (2019). Employee Turnover Prediction System. 2019 4th International Conference on Information Systems and Computer Networks (ISCON), 391–394. <https://doi.org/10.1109/ISCON47742.2019.9036180>

Johnson, R. D., & Gueuta, H. G. (2019). Transforming HR Through Technology: The Use of E-HR and HRIS in Organizations. 48.

Khalid, K., & Nawab, S. (2018). Employee Participation and Employee Retention in View of Compensation. *SAGE Open*, 8(4), 2158244018810067. <https://doi.org/10.1177/2158244018810067>

Khera, S. N., & Divya. (2019). Predictive Modelling of Employee Turnover in Indian IT Industry Using Machine Learning Techniques. *Vision*, 23(1), 12–21. <https://doi.org/10.1177/0972262918821221>

Ray, A. N., & Sanyal, J. (2019). Machine Learning Based Attrition Prediction. 2019 Global Conference for Advancement in Technology (GCAT), 1–4. <https://doi.org/10.1109/GCAT47503.2019.8978285>

Rodrigues, I. (2020). CRISP-DM methodology leader in data mining and big data. *Medium*. <https://towardsdatascience.com/crisp-dm-methodology-leader-in-data-mining-and-big-data-467efd3d3781>

Samuel, M. O., & Chipunza, C. (2009). Employee retention and turnover: Using motivational variables as a panacea. *Afr. J. Bus. Manage.*, 6.

Towns, A. (2019). Effective Strategies to Increase Employee Retention in Higher Education Institutions. 156.

Yedida, R., Reddy, R., Vahi, R., Jana, R., GV, A., &

Kulkarni, D. (2018). Employee Attrition Prediction. ArXiv:1806.10480 [Cs, Stat]. <http://arxiv.org/abs/1806.10480>.

IBM Dataset. (2019). IBM HR Analytics Employee.

Available online : <https://www.kaggle.com/pavansubhasht/ibm-hr-analytics-attrition-dataset>(accessed on 31 October 2020).



## Future of Workforce in the World of AI

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**Abstract:** *With the increasing dependency on machines and the nonstop technological up gradations, it should not come as a surprise if machines will take control of the work. But to what extent? Would we prefer to witness robots at the selling counters, or will we speak to a virtual assistant the next time we try to connect the customer service of a company? To have an accurate answer at this point of time is baffling, but this may be the scenario, say 8-10 years down the line or maybe earlier, too, perhaps.*

*Therefore, this research paper is an attempt to find out whether AI will take over the work meant for and done by humans. Humans would become slave to technology or would learn adaptability.*

**Keywords : Artificial Intelligence (AI), Technology, Job Creator**

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### Introduction

Is your mobile the first thing in the morning that you reach out for checking the time? Or putting off the wakeup alarm. Well, the answer is 'Yes', we can definitely fathom the significance of technology in the modern world where information should be available hands-on at the click of a finger and seemingly mundane task has to be performed quickly. Technology has played the role of a catalyst to expedite such processes and has made life easy. Today we majorly rely on technology for most of our daily tasks; making a call to someone, setting a reminder, sending an email, you name it and there it is, technology at your fingertips.

But technology has come a long way from the times when it had just begun its journey. One of the most notable innovations in technology is Artificial Intelligence (AI). So, what is exactly Artificial Intelligence?

Artificial Intelligence (AI) is the simulation of human intelligence processes by machines, especially computer systems. (Ed Burns, 2021)

Now, machines, have become smart; so much so that

they are on the verge of actually replacing their inventors (humans), and performing various tasks all by themselves. Take for example, Alexa or Siri, intelligent virtual personal assistants, perform whatever task we ask them to do, be it keeping a track of our meetings or calling someone without actually reaching out for your phone or even switching on your air-conditioner or the lights, music in our house, for that matter.

But the most fundamental question that crops up in our mind is- Will Artificial intelligence completely replace the humanism in near future?

With the increasing dependency on machines and the nonstop technological upgradations, it should not come as a surprise if machines will take control of the work. But to what extent? Would we prefer to witness robots at the selling counters, or will we speak to a virtual assistant the next time we try to connect the customer service of a company? To have an accurate answer at this point of time is baffling, but this may be the scenario, say 8-10 years down the line or maybe earlier, too, perhaps.

The impact of Automation on business:

It is a well known fact that as time goes ahead and

methods of conducting business change, there will definitely be changes in the job sector, as it might become necessary to accommodate newer and different ways of performing jobs with the advancements in the AI sector. As such, there is every possibility that certain departments within companies or organizations might get fully mechanized. As business processes change and job roles adjust to accommodate new ways of working with AI, it is entirely probable that certain departments within organizations will become fully computerized. Even today, this trend is already being noticed in certain areas like the IT industry. In fact, the IT sector is often referred to as the 'lights out' operations, which necessarily means that there is no need to put on the lights as there is no human presence. While taking into account the future of their businesses, the executives will have to consider a crucial element. This means that an executive will have to consider which will be the capabilities and functions that can help create a strategic identity in the market. Additionally, executives will also have to consider which would be the departments that can be fully mechanized and improved in such a way that it improves the efficiency of the organization with reduced costs.

It is true that a human being will still have to play an important role in the deliverance of these functions, but it might not be necessarily in the same roles that they had performed before the concept of AI was introduced to the world. The day when an organization is able to perform and deliver its core performances through the use of AI and becomes fully automated thereby defeating their competitors, who are still running their businesses through human labour, that day will be considered to be the game changer for the economy as a whole. That day onwards there is every possibility that entire industries might be completely wiped out and it will be difficult to guess how that might affect individual organizations and their employees. (KEARNEY)

### **The impact of AI on working culture:**

If there is any one fact that all AI experts have a unified opinion about, then it is that the introduction of AI will definitely bring magnanimous changes in business functions and models, and the workplace shall not remain unaffected on account of these changes. A search on the internet almost always gives a fast, if not based on

scientific assertions, sense of the questions pertaining to AI that are prevalent in the minds of the people. And these questions are more often than not, primarily pertaining to unemployment and jobs. As such, the principal factor that could be faced by many leaders would be as to how to introduce AI plans to the current workforce without invoking the ire of the existing employees who might consider it to be a threat to their source of employment. As per the opinion of Arjun Sethi, who is the Global Lead at Kearney's Digital Transformation Practice, it is therefore of prime importance, that organizational heads should provide all possible assistance to the employees in understanding that the introduction of AI will supplement their existing roles and help them execute their tasks in a much more simpler and easier way. Sethi has also stressed on the importance of organizational heads in demonstrating their current and future investments in the human workforce in order to maintain the engagement of employees in any organization. The best example of such a demonstration would be to conduct programs related to skill enhancements, retraining etc. which will enable to the existing employees to enhance their knowledge and skills to adapt to the new changes with the introduction of AI and this should be communicated effectively to the employees for better managerial approach. This will ensure that the new working atmosphere will be one based on trust and confidence of the employees in the management, which will in turn ensure that there is open communication and dialogue and the right collaboration, which are all extremely crucial for the success of a partnership between humans and machines. Organizational and managerial heads should realize that their own individual actions and words should be as Finally, the new working landscape will be one in which extremely high levels of transparency, reliability and collaboration are essential for the human-machine collaboration to be thriving and victorious.. Leaders will have to be ready for their own actions and performance to be as translucent and crystal clear as those of the other members of the firm, which could be one of the most challenging factors for some of the organizations and their leaders. (KEARNEY)

Therefore, this research paper is an attempt to find out whether AI will take over the work meant for and done by humans. Humans would become slave to technology or would learn adaptability.



## **Literature review**

Imagine living a life similar to that of a science-fiction movie with all technological advancements to such an extent that most of the work is done by robots. While some might enjoy such a future whereas few may think of it as a nightmare. We may witness such possibility in near future.

Based on an article by Saviom Software, it is clear the concern of people losing their jobs is not baseless, however uncertain the present scenario looks like. The article makes a mention that, according to the industry experts like Fortune, 40% of jobs will get replaced by robots in the coming 15 years. According to World Intelligence Congress, 69% of a manager's workload will be replaced by AI, chatbots and virtual personal assistants, by the year 2024.(Deshmukh, 2021)

True that with the growing innovation in the technology and machines, we can expect a more humanized machines in the long run. However, the main concern related to the job sector is that it will render certain jobs redundant. Innovations in IT and related software have enhanced our problem solving, learning, planning and reasoning qualities.

Dependency on machines and robots to do our work is increasing now, more than ever, but will all jobs be replaced by robots?

This question can be answered when we look at those jobs that involve creativity, strategic thinking, conflict resolution, emotional intelligence, and empathy and thought leadership that no robot or machine is capable of replacing. People like Human resource managers, writers, lawyers, scientists, etc. use technology to perform their activities, but completely replacing them is still a big 'NO'.

Additionally, when we take just a simple example of getting a query, regarding a product or a service, solved; most of us would want to speak to a human rather than a virtual assistant or a chatbot. Although humans have got nothing on AI, the question 'Will AI completely replace humans' still is debatable.

Another article by Mike Thomas has made a mention of Sean Chou, CEO of Catalytic (an AI startup based in Chicago) who thinks that AI, or a robot, is stupid. To justify his statement he has also mentions about watching

robot fails on YouTube. The article also states that a group of tech executives (at senior-level) in the Forbes Technology Council, enlisted 13 jobs, which include insurance underwriting, manufacturing and warehousing jobs, research and data entry, and a rather discomfiting broad category of jobs titled as 'Any Tasks That can be learned'.(Thomas, 2021)

According to the article, in an essay written by the Sinovation Ventures' CEO, AI guru Kai-Fu Lee, asserted that, out of all jobs, 50% of them will be, within 15 years, automated by AI. He also wrote that accountants, paralegals, factory workers, radiologists, to name some of the professions, will face a disruption similar to that of the farmers during the Industrial Revolution. Also with that he also mentions that, looking at the research work, the pace, at which AI will replace humans, will only gain more momentum, will affect the highlytrained and those poorly educated in the same way.(Thomas, 2021)

The Future of Jobs Report 2020 by World Economic Forum also states that 85 million jobs are expected to be replaced by AI, worldwide, by the year 2025. However, on a positive note, the report also states that with the advent of AI, 95 million new jobs will also be created with the same span of five years.

Byron Reese, the CEO of Gigaom, has a take on this aspect of AI. He opined in his recent essay that AI is "the greatest job engine the world has ever seen". (How to cite) He states that according to the forecasts, by Bureau of Labour Statistics(the BLS), that there are certain categories of jobs that will definitely see faster-than-average growth in jobs that AI is likely to impact which include occupations like those of forensic scientists, technical writers, financial specialists, medical secretaries, accountants, etc. But these will not see a growth in job despite of AI, but through AI. He further mentions that the actual gains in the jobs will come from the places beyond our imaginations.(Thomas, 2021)

Therefore, irrespective of the roles that AI will take over, it is certain that the role of humans, in performing a certain job, will not completely cease to exist but will change. This change would be in the form of re-skilling human workforce to suit the changes in the workspace.

But it is certain that several jobs will remain safe from obsolescence by AI. As mentioned earlier, the jobs that would require creation, complex and strategic planning

management, dealing with feeling or interacting with compassion and empathy would be considered AI-proof.

Hence, it can be rightly said, AI will definitely bring about some change in the job sector, meaning it will be able to flawlessly perform tasks that are repetitive, mechanical and well-structured in nature. However, the future for human workforce does not seem bleak as just with their periodical skill upgradation, humans will always be a part of the workforce.

**Revamping functionalities of HR due to the introduction of AI**

HR professionals can gain a valuable addition to their performance by having AI in their workplace. AI would be beneficial to them by giving employees updates about any policies or important announcements, and encourage a better mental health. HRs with the aid of AI can help employees by understanding their emotional score of employees' interaction along with logical recommendations to help increase the performance of employees. Additionally, these professionals can make use of data from workplace analytics to identify any flaws in the procedures of the company, to increase the efficiency of processes, to showcase collaboration patterns and improve productivity by improving management team interactions which is often the result of fading lines between personal and work space. (Varrier, 2021)

## **Research Methodology:**

### **Problem Statement:**

Artificial Intelligence has been the hype all around the world. It gained prominence in almost all fields. It has the strength to overthrow humans from workspace. The problem is will AI replace human workforce from the workplaces? What would be the shape of future workforce?

### **Research objectives:**

#### **I. To explore the impact of artificial intelligence on overall employment opportunities and peoples' perception about AI.**

Artificial intelligence has the potential to work beyond the physical limitations of human beings and can do things that humans cannot do. Therefore

this appears to be a major threat faced by the existing and potential workforce that they might either be replaced by AI partially or completely in the performance of a particular task.

On the contrary, there could also be a surge in job opportunities with the changes in the skill set of the work force. With the right training, there could be a rise in technician jobs (AI-assisted) in the healthcare industry, whereas the automated transportation industry can also expect to witness a surge in employment opportunities for engineers involved in AI and machine learning for the innovation and development of self-driving vehicles.

But knowing what is the perception of people about implementing AI in their workplaces is one of the most important things to be considered. Obviously, in the beginning stages of implementation of any change, there definitely might be some resistance and uncertainty in the minds of people and their perception would definitely play a major role in the successful implementation of AI which could consequently retain or even increase their contribution towards the success of an organisation.

#### **II. To explore the possibilities of AI becoming the new "Job Creator" and find out whether the advent of AI shall completely revolutionize the work environment.**

Implementation of AI will certainly bring radical changes; some of which might be positive and some negative. However, with the right upskilling of the existing workforce, this change can turn into an opportunity and bring in a lot of job openings. The need for data analysts, AI engineers, developers etc. will increase substantially; consequently leading to new career opportunities for people at their workplaces. It is of utmost importance for business owners to encourage their employees to up-skill and re-skill themselves to be able to effectively adapt to automation in their workplaces; and at the same time, it should be the individual efforts on the part of employees to try to upgrade and enhance their existing skills so as to gain the knowledge base that is required to work in an AI-based atmosphere in the future.

Additionally, implementation of AI for processes that are repetitive in nature and harmful for human beings to perform, will also pave the way for employees to divert their focus towards more strategically important and creative tasks that require interpersonal interactions.

### III. To understand the limitations of applications of AI.

Although the introduction of AI comes with tons of pros, the cons of integrating AI to business processes cannot be ignored. One of the most relevant of these is the overdependence on data. AI requires specific data to be fed into the system in order to be able to perform its task effectively and continuously. Without relevant data, AI may not be a viable option to get the work done. Secondly, the cost of implementing automation would be financially infeasible for a small scale business that is still at a nascent stage. This can pose as one of the major limitations in the implementation of AI. AI lacks the creativity that humans have; as a result it fails to perform any task that it was not programmed or intended to do.

Therefore, considering these points, one of the objectives of this paper was to know the limitations of implementing AI.

#### Data collection:

The report is exploratory and descriptive type. A structured questionnaire was used for primary data collection and secondary data was collected through secondary sources.

#### Sample:

**Universe:** The foremost step in developing a sample design is to obviously define the set of objects, technically called the Universe, to be studied. To this study, a population of working class was selected as the Universe.

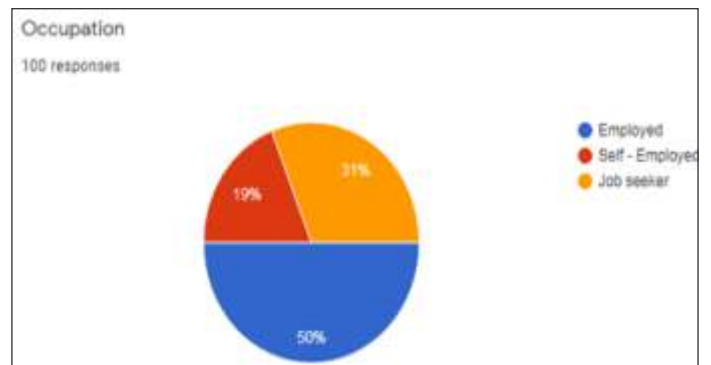
**Sample type:** Employed ones and potential employees were preferred.

**Sample size:** A sample size of 100 respondents.

#### About the respondents

The group of respondents constituted 76% females and rest males. We kept it open for all who were above 20 years of age up to 60 plus years. Around 50% belonged to the new youngest group (20-25 years of age). Remaining 50% came out as a good mixture of other age groups. About the occupation details the information is as follows.

Chart No.1

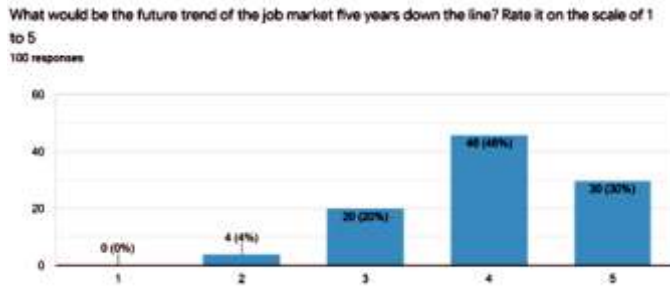


#### The Impact of AI on job Market

To explore the impact of artificial intelligence on overall employment opportunities and peoples' perception about AI.

Some of the questions asked in the survey were "Do you think that organizations have already started to implement technologies and machines that automate the business processes?" which was to be answered in a 'yes' or a 'no'. And 90% of respondents have witnessed their organizations implementing technology with automated process. About what would be the future trend of the job market 5 years down the line? For which the respondents were supposed to rate on a Likert scale of 1-5, where 1 was 'manually' and 5 was 'mechanically'. The major inclination moved towards mechanization as depicted in the graph below.

Chart No.2



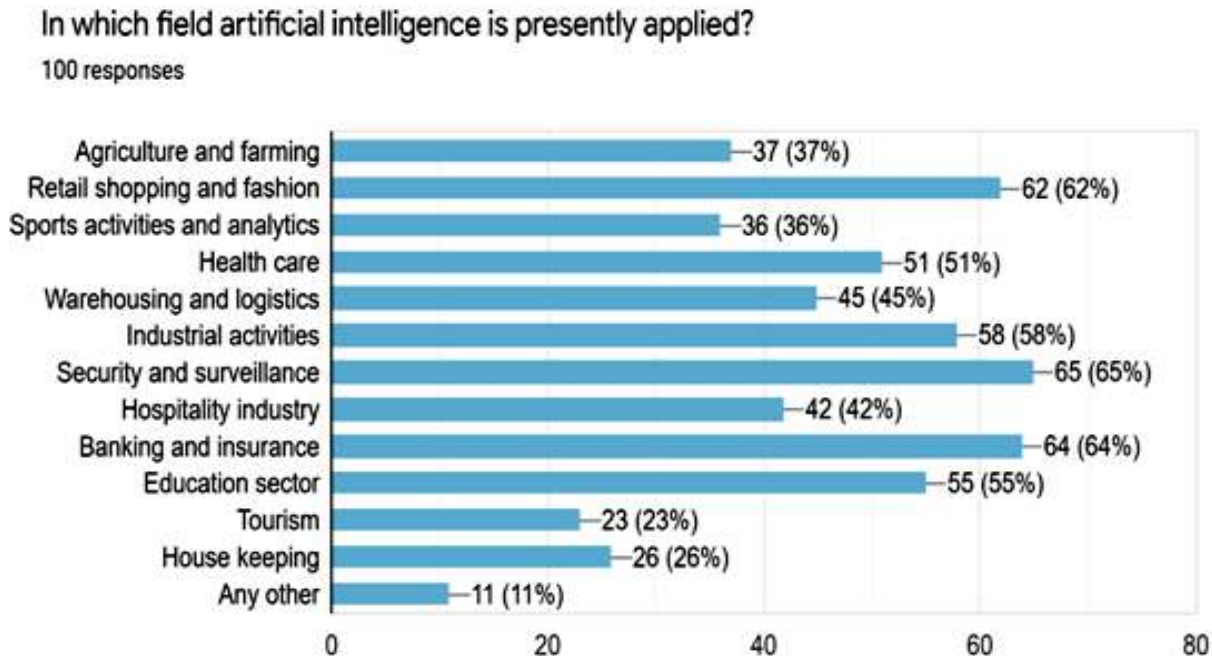
The question regarding the impact that AI will have on the job sector was also asked. From the responses received from these questions it was clear that many people are expecting AI to have a stronghold on the job market in the next few years, if not earlier. This implementation of AI will definitely see some changes in the way the work will be executed in the near future. Techies and experts say that the change in the job will be somewhat similar to the Industrial Revolution, which had wiped out certain cadre of jobs but bought in an entirely different kind of work that, for instance, made the workers to do the work manually to, now, do the work mechanically and by the way, also rendering many jobless.

### AI as Job Creator

To explore the possibilities of AI as the new “Job Creator” and if advent of AI shall completely revolutionize the work environment.”

People responded to what do you think is more efficient? ‘Work done mechanically’ or ‘Work done manually’. We could get the expected response being 73% witnessing efficiency greater in mechanization. The applications of AI were asked wherein the respondents had been given a list of fields from which they could select multiple options, some of those were Agriculture and farming, Retail shopping and fashion, Sports activities and analytics, Health care, Warehousing and logistics, Industrial activities, Housekeeping, etc. The chart shows its wide coverage.

Chart No.3





AI would prove a boon to the workers in risk involved working areas such as Long haul truck driving, Pipeline and Fuel Tank Inspections, Rescuing, Victims of Snow-Related Disasters, Welding, Working at and Cleaning up Nuclear Sites, Cow-Herding, Assess Burning Buildings (in case of Fire - Fighters), Mining, etc. AI would lead to an increase in the job opportunities for Gig workers, or contractual workers. While it is true that robots and AI-powered systems are replacing workers in gig economy, the fact that all the freelance platforms and those that connect gig workers to employers have already been AI-powered or are headed in the similar direction. This means that AI might be providing more jobs than it is taking. (Brown, 2021) AI will provide a range of work opportunities. The productivity would definitely increase, the implementation of AI would definitely ease out the workload that is now there on the people. AI will always provide the means, probably easier means, to do the same work that we do today in a 'less burdensome' way. It cannot be emphasized enough the hazards that AI can reduce in performing certain tasks like long haul driving, Mining, working on the Nuclear sites, etc. where robotics will prove to be the greatest level of achievement of AI.

### **Where could AI not reach?**

AI CANNOT COMPLETELY REPLACE HUMANS. AI, as we know it, works on a certain set algorithm, so AI or robots will, without a doubt, perform the monotonous work and those work that require to be done in the same way. AI lacks creativity like that of the humans. answers were of no surprise. It was a big NO (duh!). Plus, when asked about the capability of AI handling complex situations, the respondents had an answer no different than us. Added to this, is the cost of implementation. If big conglomerates get all their processes done by robots, what about the small-scale organizations? Would they have the finances to get a robot doing their work? Again NO. The initial cost itself will get a heavy financial burden on their heads, let alone the maintenance costs. Good luck with that!!!

Therefore, the implementation of AI will bring some changes that many won't like but that change would not completely replace humans from doing certain work, work that will involve creativity, emotions and strategic thinking.

### **Conclusion**

In technically mechanized world every activity in life is slave to technology. But human beings are not slave to technology. The work force has to be revolutionized. The work is not only concerned with its quantity and quality. It is more than that enveloping the caveat of Social & Emotional, Psychological facets of life. Efficiency/ productivity is only one microscopic angle, albeit an important one, to evaluate AI's impact on workforce and hence society in general.

The current generation of AI is good at doing a single task. The same AI that does one task efficiently struggles to do a different task with the same efficiency. Also, the current generation of AI cannot precisely explain the process of how (and why) the decision was taken. For example, an AI algorithm was trained to determine whether "windows had curtains over them or not". The AI answered correctly, but when the researchers tried to find out how the AI produce the result, they found out that the AI would first look at the floor and try to find a bed. If it found a bed, it would then conclude that the "windows had curtains" when in fact it would not even bother to look at the windows to see if there are curtains on it.

"I believe in the sanctity of our soul. I believe there is a lot of things about us that we don't understand. I believe there's a lot of love and compassion that is not explainable in terms of neural networks and computation algorithms," Lee said on "60 Minutes." (Clifford, 2019). The complex and logical based decisions required at various stages of decisions, creative based work, and coordination type work cannot be performed by artificial intelligence tools. The future workforce has to quickly adopt and learn the use of technology in their daily routine with their own holistic approach of intelligence (emotional, psychological, empathetical).

### **References**

Brown, A. (2021, September). <https://www.forbes.com/sites/anniebrown/2021/09/12/how-ai-is-making-the-gig-economy-more-fair-and-reliable-for-workers/?sh=3c78b2f237e9>. Retrieved from <https://www.forbes.com/sites/anniebrown/2021/09/12/how-ai-is-making-the-gig-economy-more-fair-and-reliable-for-workers/?sh=3c78b2f237e9>



reliable-for-workers/?sh=3c78b2f237e9#:~:text=How%20AI%20Is%20Making%20The%20Gig%20Economy%20More%20Fair%20And%20Reliable%20For%20Workers.

Clifford, C. (2019, January 14). <https://www.cnbc.com/2019/01/14/the-oracle-of-ai-these-kinds-of-jobs-will-not-be-replaced-by-robots-.html>.

Deshmukh, D. (2021, October 5). 12 jobs that AI will replace in the future. Retrieved from Saviom: <https://www.saviom.com/blog/12-jobs-that-robots-ai-will-replace-in-the-future-and-12-that-wont/>

Ed Burns. (2021, August). What is Artificial Intelligence (AI)? AI definition and how it works . Retrieved from Tech Taget : <https://searchenterpriseai.techtarget.com/definition/AI-Artificial-Intelligence>

Forum, W. E. (2020, October 20). <https://www.weforum.org/reports/the-future-of-jobs-report-2020>.

KEARNEY. (n.d.). AI and its impact on the workforce-article-kearney . Retrieved from kearney.com: <https://www.kenarney.com/digital/article/-/insights/ai-and-its-impact-on-the-workforce>

Moore, P. V. (2021). Artificial intelligence in workplace: What is at stake for workers . Retrieved from Open BBVA : <https://www.bbvaopenmind.com/en/articles/artificial-intelligence-in-workplace-what-is-at-stake-for-workers/>

Thomas, M. (2021, July 26). Will a robot take your job? AI and the Future of jobs. Retrieved from Builtin Beta: <https://builtin.com/artificial-intelligence/ai-replacing-jobs-creating-jobs>

Varrier, R. (2021, June 10). Artificial Intelligence In The Workplace - 2021 And Beyond-Rajesh Varrier. Retrieved from BW Businessworld : <https://www.businessworld.in/article/Artificial-Intelligence-In-The-Workplace-2021-And-Beyond/10-06-2021-392623/>



## Working capital Management and its impact on the Profitability of the Indian automobile sector

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**Abstract :** Profitability, and efficient Working Capital Management are hand to hand to make an organisation successful. Proper allocation of cash flows increases liquidity and simultaneously increases profitability. The purpose of this study is to develop the research on the relationship between Working Capital Management and efficiency by investigating how it is affected by different factors. A quantitative method will be applied in objectivism and positivism and deductive theory was used to approach the subject. Data is collected related to working capital cash management credit management and efficiency ratio to confirm, how fast a company turns purchased products into profit, with Gross Profit Margin as the measure of Profitability. The data analysed is financial information from 2019-21, collected from a secondary source, Annual Reports of the companies. Correlation analyses and descriptive statistics will be used to analyse the relationship between Working Capital Management and gross profit is compared between the different company groups. The profitability, and the sensitivity to determinants of Working Capital Management is analysed.

**Keywords:** Working Capital Management, Inventory, Profitability, Trade Receivables Gross Profit.

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### 1 Introduction :

Working capital is a concept of financing short term liabilities from short term assets, whereas working capital management is a tool to match the timing of inflow of funds from current assets with outflow of funds to current liabilities. Perfect matching of timings between inflow and outflow of funds makes the effect on companies' profitability. Cost of Long-term financing is higher than short term financing sources, therefore it is profitable to do optimum utilisation of short-term funds for the payment of current liabilities. Working capital management challenges are to maintain liquidity and timing to pay short term debt and maintain the level of inventory and debtors to maintain the sufficient cash flow. Some of the tools used are ratio analysis and comparative analysis and descriptive analysis. High level of working capital as well as low level of working capital are harmful for companies' health because higher level of working capital will reduce profitability because of non-utilisation of funds and lower level of working capital may create impact on company's liquidity conditions and credit history. Efficient and timely

management of working capital increases profitability of the company.

### 2. Literature Review :

Avinash. P and Etal (2018) studied "the impact of working capital management on corporate performance: An empirical analysis of selected IT firms in India". The study was conducted on the importance of current assets in comparison to other assets for the period of 2008 - 2017. The study concluded that the working capital and its components have positive influence on assets. Similarly Patel Charmibenvimalbhai (2016) studied the working capital and operations of the company for automobile sector, Hero MotoCorp Ltd. and Ambica Motors, Gujarat" for the period of 2013 to 2016. The study analysed working capital and its components for example debtors, receivables cash and creditors and concluded these make impact on the operations and financial position and which was good for the period of study. The author suggest that the working capital to sales ratio ratio should be adequate and utilisation of

working should have done maintain the financial viability in the company. S Baños-Caballero, PJ García-Teruel (2014) concluded on the basis of non financial companies data analysis of UK supports U shaped relationship between working capital and company performance. Next study of Baños-Caballero, S., García-Teruel, P. J., & Martínez-Solano, P. (2019) Analysed working capital company valuation data for 30 countries for the period of around 20 years. They concluded that the working capital have mixed effect on valuation of the company. Effect of working capital on valuation depends upon economic development and investor protection environment of the company. Chazal Du Mee in 1988, concluded that 60% of the companies researched were suffering from a poor cash management. Further, Rafuse (1996, p. 59) concluded in his study how poor working capital management (WCM) and alteration in debtors and creditors will hardly create value in the system but a major cause of default in UK firms.

### 3. Problem background:

If working capital inflow and outflow mismatch might outperform in one quarter at the expense of liquidity crisis in the next period, will create mismatch problem in asset-liability of working capital system. (Padachi, 2006, p. 45). The purpose of working capital management are to match the short-term inflows and outflows to maintain liquidity and solvency of the organisation. The system makes sure that cash position and debtors' inflow should be more than the creditors payment. Otherwise, the firm will quickly become insolvent. The level of inventory held is also a big concern for maintain the balance between inflow and outflow. An excessive inventory means unsold products and higher creditors which creates negative working capital and denotes the higher short-term liability than short term pay out in the expectation of high sales. Higher debtors shows that less efficient marketing efforts to convert debtor in cash. Both the reasons will increase current assets and mismatch the timing of inflow and outflow.

The study is done on automobile industry and selected the companies from different segments of automobile sectors. The working capital to sales ratio and net Income

ratios are compared establish relationship between working capital and profitability.

### 4. Objectives:

- To find out the determinants of working capital
- To Analyse working capital and profitability and efficiency relationship
- To analyse the impact of working capital on profitability in auto mobile industry.

### 5. Methodology :

Data were collected from the yahoo finance and company's annual report or 10K for auto mobile sector from 2019 to 2021. The Maruti Udyog Ltd and Tata motors limited, Bajaj Auto and Ashok Leyland are selected as a sample from automobile sector. The study used descriptive statistics tool with the help of excel for analysis. In line with previous research (Baños-Caballero et al. 2014), The research is based on the Net working capital level, sales growth and Net working capital to sales ratio are considered for working capital management analysis, working capital to sales ratio is calculated as  $(\text{Inventories} + \text{Debtors} - \text{Creditors}) / \text{Sales}$ . Similarly as per previous studies (Aktas et al. 2015; Bořec and Anton 2017).

The econometric analysis regresses firm profitability against the net working capital to sales ratio is considered. Firm performance is measured by return on sales (NI), an overall indicator of profitability, calculated as net income to sales whereas gross return on sales (Gross Profit ratio) can be considered as an alternative measure of profitability.

Secondary data from the annual reports of Auto Mobile Industry is tabulated for data analysis. Sales, total assets, working capital, profitability and components of working capital for example creditors, trade debtors, inventory and investment data is collected from the annual reports of Bajaj Auto, Ashok Leyland, Maruti Suzuki and Tata Motors from 2019 to 2021.

Ashok Leyland and Bajaj Auto data is compared to conclude the relationship between working capital and

profitability, whereas Maruti and Tata Motors data is compared through descriptive statistics analysis using excel.

Data Analysis: Working Capital to sales ratio and Net

Income ratio for Bajaj Auto and Ashok Leyland is tabulated in following table for comparative analysis and graphical representation.

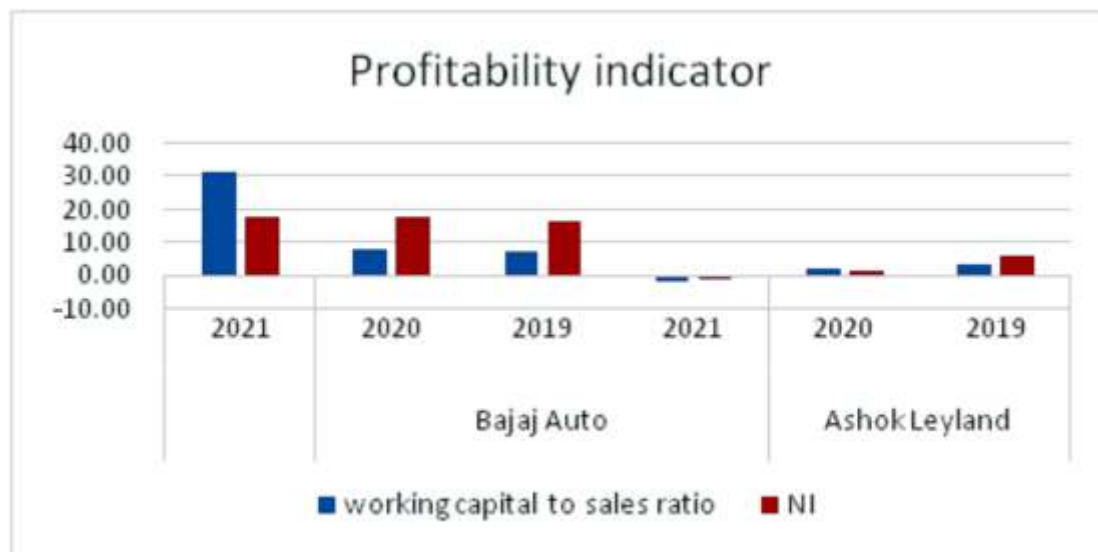
Table 1. Working Capital to Sales and Ni

	Bajaj Auto			Ashok Leyland		
Year	2021	2020	2019	2021	2020	2019
working capital to sales ratio	31.37	8.10	7.42	-1.57	2.37	3.58
NI	17.833	17.867	16.623	-0.853	1.548	6.347

Self Compiled data on the basis of annual Reports (Bajaj Auto and Ashok Leyland)<https://www.bajajauto.com/investors/financial-and-operational-performance>

<https://finance.yahoo.com/quote/ASHOKLEY.NS/financials?p=ASHOKLEY.NSF>

Figure 1: Working Capital to Sales and Ni chart



The Above graph shows that Bajaj Auto Profitability was same for 2019 and 2020 because of Covid period and has increased in 2021 but on the same note sales to working capital ratio has increased because sales has decreased in sales in 2021 and increase in Working Capital. Similarly, Ashok Leyland Profitability is continuously decreasing from 2019 to 2021. Therefore in the same way working capital to sales ratio is decreasing and both become negative due to sales has gone down drastically. This data analysis establishes a relationship between profitability and working capital.

Supplementary independent variables are also considered to account for additional determinants of working capital and corporate performance, as follows: Current Ratio calculated as the sum of t current liabilities and over current assets asset; cash ratio computed as cash and cash equivalents divided to total assets; the one year growth rate in sales as a proxy for growth opportunities; firm size, measured as the total assets to sales ratio. The dependent variables are described in Table 1 for Bajaj Auto and Ashok Leyland.

**Table 2: Independent and dependent Variable related to Working capital and Profitability**

	Bajaj Auto			Ashok Leyland		
Year	2021	2020	2019	2021	2020	2019
Working capital to sales ratio	31.37	8.10	7.42	-1.57	2.37	3.58
ROA	14.45	19.66	17.09	-0.39	0.88	5.31
Gross Profit Ratio	26.28	26.35	24.83	37.53	38.37	33.65
cash to sales ratio	0.00	0.00	0.00	0.00	0.01	0.01
Sales growth ratio	-0.07	-0.02	0.18	-0.11	-0.34	10.06
Current ratio	2.51	1.56	1.45	0.98	1.03	1.08
TotAssets to sales ratio	0.81	1.10	1.03	0.46	0.57	0.84
Sales (Rs in cr)	27236.19	29170.55	29642.66	19377.76	21748.12	32753.24
NI	17.833	17.867	16.623	-0.853	1.548	6.347
<b>Investment</b>	1,493	1,064	961.5	109.2	814.20	551.41
<b>Inventories</b>	8,028	2,780	1,576	2,142.03	1,238.00	1,536.04
<b>Trade</b>	2,717	1,725	2,559	2,816.00	1,188.35	1,496.16
<b>Cash and equivalents</b>	505	277.33	9150	730	1290	2,188.24
<b>Creditors</b>	4,453	3,186	784	16223	14794	15315

Self Compiled data on the basis of annual Reports (Bajaj Auto and Ashok Leyland)

<https://www.bajajauto.com/investors/financial-and-operational-performance>

<https://finance.yahoo.com/quote/ASHOKLEY.NS/financials?p=ASHOKLEY.NS>

Negative Profitability and Working capital and ROA in 2021 and good appropriate working capital and good profits in 2019 of Ashok Leyland shows that negative

working capital will make an negative impact on working capital optimum working will make positive impact on working capital.

#### **Descriptive Analysis:**

Following tables displays the descriptive statistics for firm profitability, working capital ratio,

and the control variables for Tata Motors and Maruti for 2019 to 2021.



Table 3: Descriptive statistics for Maruti Suzuki India Limited

	<i>ROA</i>	<i>current ratio</i>	<i>Inventory to sales ratio</i>	<i>Total liabilities to asset ratio</i>	<i>working capital to sales ratio</i>	<i>Trade receivables to sales ratio</i>
Mean	9.99	0.82	0.0410431	0.26514076	-0.0301	0.0229944
Median	10.47	0.81	0.0410762	0.2679754	-0.03027	0.0229574
Std Dev	3.13	0.266083	0.0022546		0.054131	
Range	6.97	0.64	0.0047103	0.07073458	0.131361	0.008886
Minimum	6.03	0.51	0.0386548	0.22693882	-0.09561	0.0185884
Maximum	13.00	1.15	0.0433651	0.29767341	0.035755	0.0274744

Self Compiled data on the basis of annual Reports (Maruti Suzuki Pvt Ltd)

<https://www.marutisuzuki.com/corporate/investors/financials>

Return on assets is, on average, around 9.99%, while the working capital ratio represents, on average, -3% of sales. The value for ROA values are positive so it is more than those reported for the German non-financial firms (1.1%

reported by Dalci et al. 2019) but comparable with those reported for the Finnish firms (8.4% reported by Enqvist et al. 2014).

Table 4: Descriptive statistics for Tata Motors Limited

	<i>ROA</i>	<i>current ratio</i>	<i>Inventory to sales ratio</i>	<i>Total liabilities to asset ratio</i>	<i>working capital to sales ratio</i>	<i>Trade receivables to sales ratio</i>
Mean	-3.44	0.583	11.753	0.677	-0.054	0.009741
Median	3.11	0.590	10.920	0.683	-0.057	0.001038
Std Deviation	-2.71	0.039	2.123	0.035	0.026	0.009635
Range	14.95	0.090	4.510	0.071	0.055	0.004446
Minimum	-11.64	0.530	10.330	0.636	-0.078	0.007625
Maximum	3.31	0.620	14.840	0.707	-0.023	0.01207

Self Compiled data on the basis of annual Reports (Tata Motors Ltd)

<https://www.tatamotors.com/investors/annual-reports/>

Return on assets is, on average, around -3.44%, while the working capital ratio represents, on average, -5.4% of sales. The value for return on assets values is negative so it is not comparable with those reported for the other firms but considerably lower than those reported for the manufacturing firms.

Average Net working capital is negative for Tata Motors and Maruti Suzuki India Ltd whereas per USA standard industry NMC is positive whereas account payable to sales ratio should be more than account receivables to sales ratio.

**Table 5 Maruti Suzuki**

	ROA	current ratio	Inventory to sales ratio	Trade receivables to sales ratio
ROA	1			
current ratio	-0.83175	1		
Inventory to sales ratio	-0.91856	0.544568679	1	
Trade receivables to sales ratio	0.170014	-0.01769358	0.242983068	1

The correlation analysis of Maruti shows correlations among the dependent and independent variables of the econometric model. It can be noticed that the coefficient between ROA and Current ratio is more negative than Tata Motors, which shows that working capital management, has a very less effect on profitability in Maruti compare to Tata Motors. The

results also indicate a negative effect of inventory to sales ratio on the Profitability concludes that is a inverse relationship been increase in inventory and profitability. Growth in sales is positively related to working capital. The correlation matrix highlights low correlations between independent regressors.

**Table 6: Tata Motors**

	ROA	current ratio	Inventory to sales ratio	Trade receivables to sales ratio	working capital to sales ratio
ROA	1				
current ratio	0.657453	1			
Inventory to sales ratio	-0.47186	0.349445	1		
Trade receivables to sales ratio	0.754432	0.71699	-0.16045	1	
working capital to sales ratio	0.231948	0.882253	0.729005	0.512252	1

The correlation analysis of Tata motors shows correlations among the dependent and independent variables of the descriptive analysis. It can be noticed that the coefficient between Return on Asset and current ratio is positive, which shows that it, has a less efficient effect on profitability in Tata Motors. The results also indicate a negative effect of inventory to sales ratio on the working capital level. Growth in sales may have a positive impact on working capital if inventory and debtors are well managed. The correlation matrix highlights low correlations between working capital and profitability.

## 6. Scope:

The study will be done for longer period and regression model can be used to find a regression equation between profitability and working capital.

## 7. Conclusion:

The study analysed the relationship and dependency of profitability on working capital for the automotive sector in India. Tata Motors Ltd and Maruti Suzuki Ltd, Bajaj Auto, and Ashok Leyland, legendary companies of India are selected for the analysis. A graphical comparison is concluded the direct relation between Working capital to sales ratio and Net income to sales ratio (NI) as profitability ratio for Bajaj Auto and Ashok Leyland. Working capital to sales ratio and Working capital to sales ratio, receivables to sales ratio, inventory to sales ratio and current ratio are analysed to find out the dependency of ROA on the element of working capital is analysed through statistics summary and correlation analysis.

The result shows that there is a negative relationship between ROA and working capital elements as per descriptive analysis for the Maruti and Tata motors, representatives of automotive sector.

## 8. References:

- Bořec, C., & Anton, S. G. (2017). Is profitability driven by working capital management? Evidence
- for high-growth firms from emerging Europe. *Journal of Business Economics and Management*, 18(6), 1135-1155.
- Hillergren, M., & Björkman, H. (2014). The Effects of Working Capital Management on Firm Profitability: A study examining the impacts of different company characteristics.
- Beck, N., & Katz, J. N. (1995). What to do (and not to do) with time-series cross-section data. *American political science review*, 89(3), 634-647.
- Bořec, C., & Anton, S. G. (2017). Is profitability driven by working capital management? Evidence for high-growth firms from emerging Europe. *Journal of Business Economics and Management*, 18(6), 1135-1155.
- Amponsah-Kwatiah, K., & Asiamah, M. (2020). Working capital management and profitability of listed manufacturing firms in Ghana. *International Journal of Productivity and Performance Management*.
- Patel Charmiben, V. (2017). A Study on Working Capital Management at Hero Motocorp Ltd. Ambica Motor, Gujarat.
- Baños-Caballero, S., García-Teruel, P. J., & Martínez-Solano, P. (2014). Working capital management, corporate performance, and financial constraints. *Journal of business research*, 67(3), 332-338.
- Baños-Caballero, S., García-Teruel, P. J., & Martínez-Solano, P. (2019). Net operating working capital and firm value: A cross-country analysis. *BRQ Business Research Quarterly*.
- Baños-Caballero, S., García-Teruel, P. J., & Martínez-Solano, P. (2014). Working capital management, corporate performance, and financial constraints. *Journal of business research*, 67(3), 332-338.
- <https://www.bajajauto.com/investors/financial-and-operational-performance>



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