Big Data Management

(EBUS622)

Individual Coursework

Professor: Omar Alsayed

Report By:

Student ID- 201595383

Content

List of Figures

Executive Summary

Mindtree, a mid-size IT firm was recently acquired by Larsen & Toubro (L&T) Group of companies and has been performing very well over the years despite of the setbacks that erupted due to pandemic Covid-19. Mindtree continues to maintain its independent management and concentrate on delivering successful growth by analysing accounts better, executing multi-year annuities, partnering effectively and acquiring targeted companies. (Ayushman Baruah, 2020). It is astonishing to see how Big Data is influencing the different verticals of the business and how companies across the globe are trying to develop themselves and build their analytical capabilities to Stage 5 so as to become Analytical competitors. This report aims to analyse the potential that big data possesses for an Organization in the Human Resources (HR) domain and how it can be to prevent attrition using different modelling techniques.

The initial part consists of relevant analysis of literature from different journals wherein big data techniques have been applied across different kind of datasets across the HR domain. In the next part the complications that may arise due to attrition are analysed through the SWOT (Strengths, Weakness, Opportunities, Threats) Analysis of the Organization.

The next part shows how data for the model is being sourced and what kind of modelling techniques should be applied so as to train the model for better predictive and prescriptive analytics that could be utilised by the organization for prevention of attrition and retention of talented professionals so that the organization would benefit in the competitive environment.

1.Introduction

Mindtree was founded by professionals with nothing more than their skills and a single purpose: to create something extraordinary with their skills. This sense of shared purpose, passion and ownership has shaped a unique organizational culture that has driven quality products and services. After 20 years of being in the business as a mid-size IT firm, Mindtree was taken over by Larsen & Toubro Group which itself is one of the leaders in all the verticals of business including Engineering, Construction, Manufacturing and Technology. This report starts with a brief background of Mindtree and their involvement in IT service and Consulting sector followed by a current issue which they are facing for some time now. After that, their usage of Big Data Analytics capability is detailed and analyzed to understand their present stage. And, an analytical solution is devised using Predictive and Prescriptive techniques for reducing attrition and implementations that needs to be considered and solved.

2.Background

Mindtree, an IT Service and Consulting Company, is a part of Larsen & Toubro Group as shown in Figure 1. It was established by 10 IT professionals from companies such as Cambridge Technology Partners and Wipro. (Nandakumar, 2012) A progressive shift of the company's initial positioning from an e-business integrator to an enterprise service provider was the major achievement. Their technology business also included developing the world's smallest Bluetooth stack that was used in hand-held devices and other appliances for companies such as Sony and Epson which soon became a strong reason for customer attraction. (Making of the MindTree Part II (1999-2003), 2017). With their consulting-driven approach, Mindtree is regarded as one of the most strategic partners to numerous Fortune 500 companies. (Mindtree, 2014).
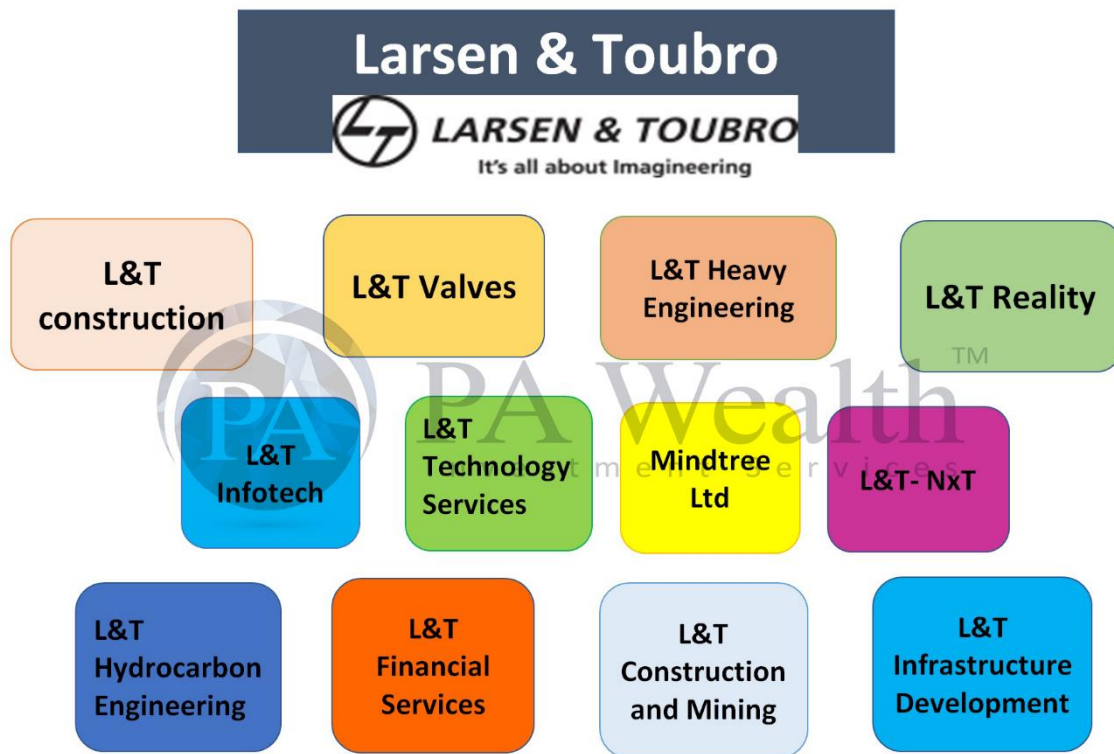
Figure 1: L&T Group Companies (L&T Group: Know about its businesses, 2021)

Despite being the newest member of L&T's family of firms, Mindtree continues to maintain its independent management and its unique culture. Additionally, the firm would be able to benefit from the strengths of its parent company. (SN Subrahmanyan, 2019).

Despite of all the numbers being in their favour, **attrition** happens to be one such concern which continues to threaten their manpower. The company is mainly concerned about the impact of wage hikes on their bottom lines as they compete with peers, international rivals, and startups for talent. (Economic Times, 2021).
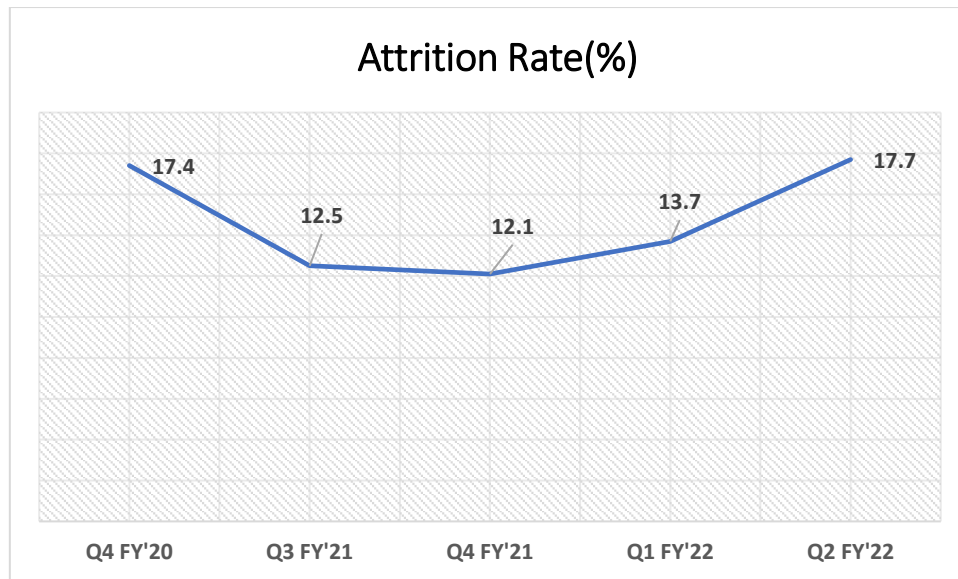
Figure 2: Mindtree Ltd. -Attrition Rate (%) (Economic Times, 2020). (Economic Times, 2021)

3. Review of Literature

The term attrition refers to any method of losing personnel, such as voluntary resignations, layoffs, and failures to return from leaves of absence. Basically, it is of two types Voluntary and Involuntary. Voluntary attrition refers to the fact when an individual decides to leave the company for reasons such as moving to a different city, not happy with the working culture, resignation for a new job etc. And, Involuntary attrition happens when a company decides to part ways with an employee for reasons such as unsatisfactory performance for a continuous period, absenteeism problem, for misconduct in workplace etc. The various factors which cause employee attrition, some may be under the control of an organisation and some may not such as low unemployment of that particular sector, workforce demographics, unfriendly workplace, business relocation, uncertain times during a pandemic such as COVID-19, Organization restructuring etc. Over the years different companies have tried various ways to prevent this phenomenon through Learning & Development of high performing employees, benchmarking salary structure across the same sector, being more flexible, accurate job postings and timely promotion for deserving employees but somehow it happens to remain

the same specially in IT sector companies. (Lucas, n.d.). With the advent of Big Data

Analytics in the organizational setup, companies have started using the same to predict the

employee attrition for them and also to target particular segment employees so that the

companies do not lose their focus on them and there are various research papers and journals

on how different companies deal with the common concern. Human Resources (HR)

managers of different organizations use people analytics a sub-part of Big Data Analytics &

Machine learning techniques to reduce attrition by changing the way of recruiting and

retaining talent. The first part for employee attrition modelling consists of a mixed method

combining exploratory study to refer HR datasets and Quantitative study to sort out the

chosen features and conclude with a final employee attrition model as shown in Figure 3.

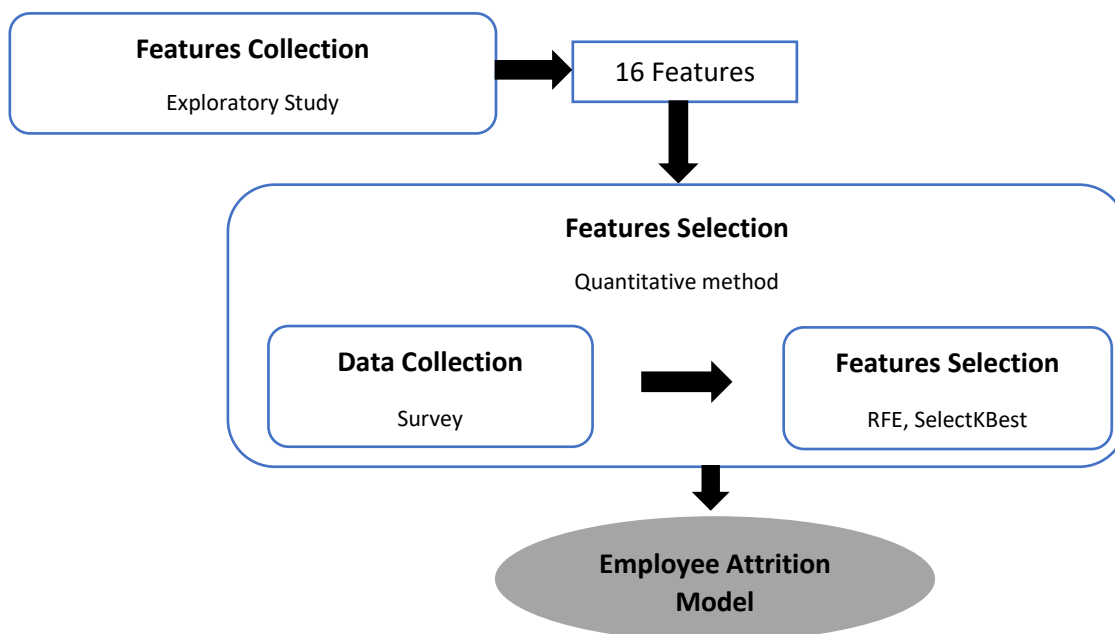(Yahia, Hlel and Colomo-Palacios, 2021.

Figure 3: Mixed method for employee attrition modelling (Yahia, Hlel and Colomo-Palacios, 2021)

4. Complications

Mindtree has been progressing steadily in terms of building its analytical capabilities like

from setting the foundation and taking the company to successful IPO to expertise led

strategy, wide and deep technology SME (Small and Medium sized enterprise) pool, key partnership and alliances to driving change to maintain digital leadership. (Mindtree, 2017). Mindtree, with all its efforts in the technological domain continues to be in Stage 4 that is they are an analytical enterprise whose top leadership is inclined towards digital transformation with a view of business priority but due to lack of human capital management at the right place and right time they are unable to be in competition with their other analytical rivals and progress to Stage 5. Organisations which are inclined to use analytics and want to progress through the five stages of Analytical capability model from Analytically Impaired to Analytical Competitor must excel in all the fundamental elements of **DELTTA (Data, Enterprise, Leadership, Targets, Technology, Analysts and Analysts techniques) Plus Model framework**. (Davenport, 2018). Now, to develop strategic planning companies use a framework called **SWOT (Strengths, Weakness, Opportunities, and Threats)** to assess internal and external factors which can be derived from the DELTTA model.

Strengths
a) Data driven decision - making
b) Supportive Leadership
c) Analytical Targets
d) Adapting advanced technologies

Weaknesses
a) Creating mindset for digital transformation
b) Skilled analysts required

Opportunities
a) Targeting International Markets
b) Evolving market size and customer choices
c) Developments in technological field

Threats
a) Competition from new entrants
b) Geo-Political factors

Figure 4: SWOT Analysis of Mindtree

Strengths:

a) **Data driven decision-making** - With the advent of big data, Mindtree is not only using it to better its products, but to better serve its clients by taking advantage of the opportunities and potentials that it can open up in the future. (Mindtree, 2014)

b) **Supportive Leadership**- The senior leadership at Mindtree understands the importance of Industry 4.0 and its Big Data applications on various platforms of the business and suggests that the company should start step by step transformation which would help in leveraging the digital footprint later. (Lambu, 2021)

c) **Analytical Targets**- Mindtree acquired NxT Digital which would enhance their growth possibilities in Internet of Things (IoT) platforms as NxT Digital is not only connected to manufacturing industries but also retail and Consumer packaged goods (CPG). (Sangani, 2021).

d) **Technological Advancements**- Adoption of advanced technologies not only in business front but also implying it on the human capital is the need of the hour and Mindtree has already deployed it in the recruitment of employees. (Janarthanan, 2021)

Weaknesses:

a) **Creating mindset for digital transformation**- The senior leadership at Mindtree understands that culture plays an integral role in virtually every aspect of change and it is crucial to understand its influence and significance in sustaining the momentum as well. (Nevatia, 2021)

b) **Skilled Analysts required**- The bridge that DevOps and Agile offers between Development and Operations of a product is somewhat quite difficult to maintain across uniformly and for which skilled analysts and automation-friendly components are required for end-to-end data completion of work. (McKendrick, 2021)

Opportunities:

a) **Targeting International Markets**- Globalization has created opportunities in the international market and Mindtree can capitalize on that and increase its hold in international markets so as to diversify its risk and it will also become less dependent upon the domestic market to earn revenue.

b) **Evolving market size and consumer choices**- With the start of digital transformation, Mindtree needs to form key partnership and alliance, wide technology pool of professionals and enhance brand reputation through account-based sales and marketing. (Mindtree, 2016)

c) **Developments in Technological field**- Big Data boom that is changing the technological scenario around the globe rapidly could be used by Mindtree to improve efficiency of processes and shift from a conventional approach to a more digital approach.

Threats:

a) **Competition from new entrants**- As the Big Data techniques are being used rapidly, Mindtree can use low cost to reach clients using tried and tested tools and techniques but so can the new entrants with the advancement of technology.

b) **Geo-Political factors**- Developments such as surge in gas prices, financial crisis etc impact the business scenario of the world thus forcing company to change their strategy of managing their business.

5. Solution & Implementation

 Voluntary Attrition or employee turnover is affecting Mindtree in a big way as the type of analytics that could help them solve this problem would be Predictive analytics which would show the segment of employees most likely to leave and Prescriptive analytics which would give recommendations to the top management based on the given predictions.

Figure 5 represents the data science process in different phases that will be used for data capturing and developing the model.
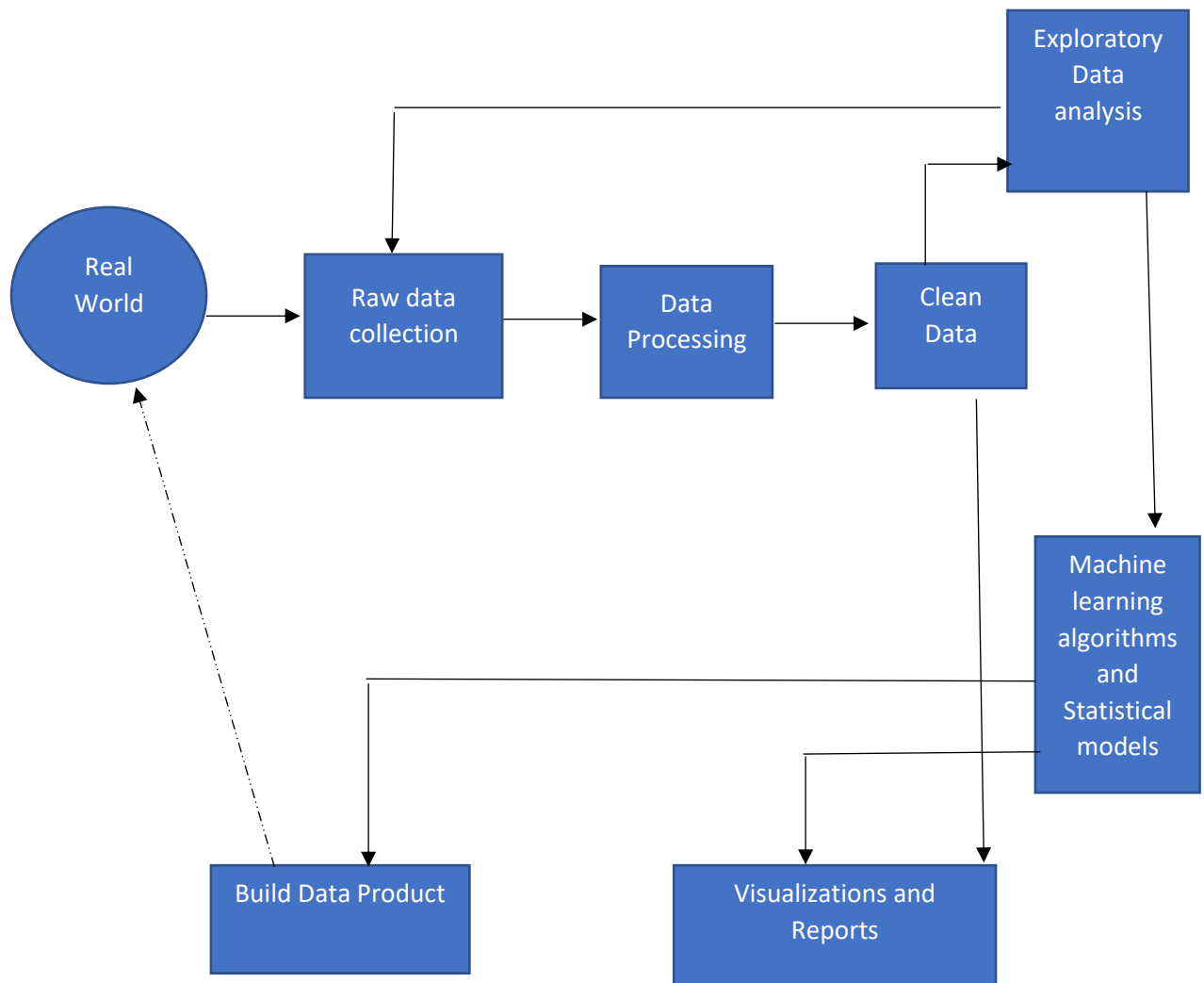
Figure 5: Data Science Process (Pujadas, 2016)

The first step in modelling involves Data Sourcing which can be collected from social media, Talent Acquisition, Exit interviews, Recruitment, skill testing tools. The data collected will consist of features like Age, Department, Gender, Marital status, Monthly income etc. In data analysis part, the dataset is checked for numerical variables and all the categorical attributes as well are assigned a numerical value so that the consistency is maintained in dataset. In order to confirm which variables are affecting attrition, a heatmap correlation is established between all the variables so as to ensure which variables are correlated and which are not and then proceed to data modelling with the variables which are poorly correlated.
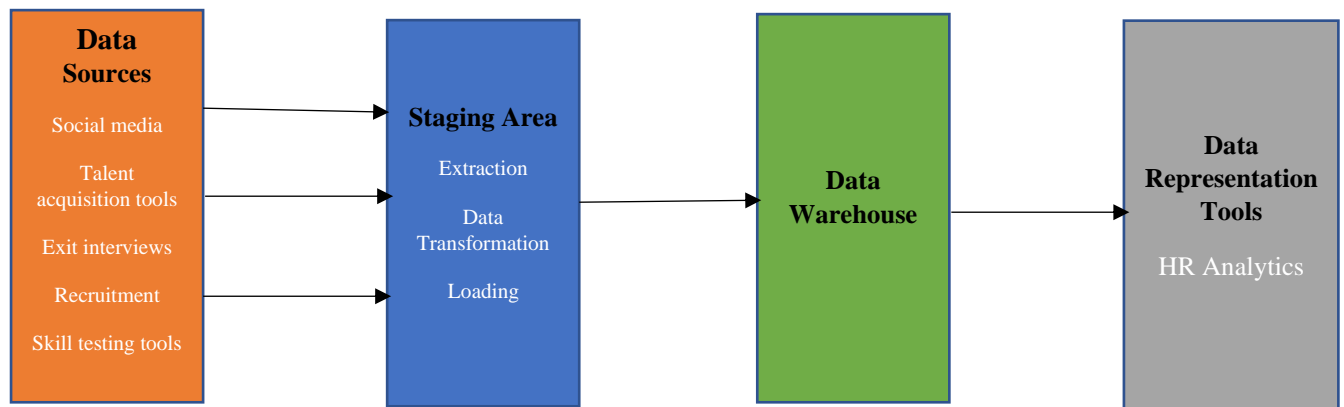
Figure 6: Data Modelling Steps (How to Successfully Implement HR Analytics and People Analytics in a Company, 2019)

Here, the data storage will be done in top-down approach wherein data warehouse will be in between data sources and data representation tools. Once the staging area is done, there are various supervised algorithms which are used to develop the model such as Logistic Regression, Decision Tree, K-Nearest neighbors, Naïve Bayes, Support Vector Machines (SVM), and XG Boost (Extreme Gradient Boosting). The results from all the classifiers would justify that the chosen features are the main reasons for voluntary attrition. (Mhatre et al., 2020).

A pre-warning system which is node-based web application can act as a main system for the organization to differentiate amongst high, moderate and low risk employees along with the cost of employee turnover for that month if attrition happens. Also, by examining the data which variables are likely to affect attrition can be pointed out and the same can be verified from employee reviews forum such as Glassdoor, Naukri.com etc.

Another type of differentiator such as RBG(Red, Blue, Green) indicator can be used wherein red would represent the most vulnerable cluster and green would depict the safe cluster .The

developed model needs to be tested for a period of 30 to 45 days and assuming a balanced rate of attrition , the organization can not only try to asses direct and indirect impact that attrition would have on different features but also simultaneously create a pool of skilled professionals to carry digital transformation forward. (Mhatre et al., 2020)

6. Conclusion

Attrition whether voluntary or involuntary can affect a company and Mindtree would be on the positive side if the datasets and data modelling is applied accordingly then it would help the company to minimise the rate of attrition and also analyse the aptitude loss and period of transition taking place.

References:

Altexsoft, 2019. How to Successfully Implement HR Analytics and People Analytics in a Company. Available at: https://www.altexsoft.com/blog/how-to-implement-hr-analytics/ [Accessed 4 November 2021].

Ayushman Baruah, 2020. *Mindtree outlines 4x4x4 strategy to focus on growth*. [online] Available at: https://www.livemint.com/companies/news/mindtree-outlines-4x4x4-strategy-to-focus-on-growth-11607059274105.html [Accessed 28 October 2021].

Davenport, T., 2018. *DELTA Plus Model & Five Stages of Analytics Maturity: A Primer*. [ebook] Available at: https://www.bastagroup.nl/wp-content/uploads/2019/05/IIA-Delta-Plus-Primer-2018.pdf [Accessed 2 November 2021].

Economic Times, 2021. Mindtree Q3 results: Net profit rises 66% to Rs 326.5 crore Read more at: https://economictimes.indiatimes.com/markets/stocks/earnings/mindtree-net-profit-rises-65-7-to-rs-326-5-cr-in-dec-quarter/articleshow/80330003.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst. [online] Available at: https://economictimes.indiatimes.com/markets/stocks/earnings/mindtree-net-profit-rises-65-7-to-rs-326-5-cr-in-dec-quarter/articleshow/80330003.cms [Accessed 29 October 2021].

Janarthanan, J., 2021. "Tuning into a New Reality": Mindtree's Paneesh Rao on HR Tech. *Business World*, [online] Available at: http://bwpeople.businessworld.in/article/-Tuning-into-a-New-Reality-Mindtree-s-Paneesh-Rao-on-HR-Tech-/15-02-2021-377831/ [Accessed 2 November 2021].

Lambu, V., 2021. Industry 4.0 Means One Thing: Informed Business Decisions. [Blog] *Forbes Technology Council*, Available at: https://www.forbes.com/sites/forbestechcouncil/2021/09/10/industry-40-means-one-thing-informed-business-decisions/?sh=39f294b76f84 [Accessed 2 November 2021].

Lucas, S., n.d. Employee Attrition: All You Need to Know. [Blog] *AIHR*, Available at: https://www.aihr.com/blog/employee-attrition/ [Accessed 29 October 2021].

McKendrick, J., 2021. *DevOps and agile still hindered by enterprise silos, inertia | ZDNet*. [online] ZDNet. Available at: https://www.zdnet.com/article/devops-and-agile-still-hindered-by-enterprise-silos-inertia/ [Accessed 2 November 2021].

Mhatre, A., Mahalingam, A., Narayanan, M., Nair, A. and Jaju, S., 2020. Predicting Employee Attrition along with Identifying High Risk Employees using Big Data and Machine Learning. In: *2020 2nd International Conference on Advances in Computing, Communication Control and Networking (ICACCCN)*. [online] IEEE. Available at: https://ieeexplore.ieee.org/document/9362933 [Accessed 4 November 2021].

Mindtree, 2014. *Big Data Leads to Big Opportunities*. [online] Available at: https://www.mindtree.com/about/investors/annual-reports/annual-report-2014-2015/making-digital-real/big-data-leads-big [Accessed 2 November 2021].

Mindtree, 2014. *Mindtree Wins the 'Most Promising Company of the Year' Award from CNBC TV18*. [online] Available at: https://www.mindtree.com/about/news/mindtree-wins-most-promising-company-year-award-cnbc-tv18 [Accessed 28 October 2021].

Mindtree, 2016. *Management Discussion and Analysis*. [online] Available at: https://www.mindtree.com/about/investors/annual-reports/annual-report-2015-2016/management-discussion-and-analysis# [Accessed 3 November 2021].

Mindtree.com. 2017. *Making of the MindTree Part II(1999-2003)*. [online] Available at: https://www.mindtree.com/sites/default/files/2017-11/making-of-mindtree-2_0.pdf [Accessed 28 October 2021].

Mindtree, 2017. *Mindtree 3.0 Powering New Possibilities*. [online] Available at: https://www.mindtree.com/sites/default/files/2017-10/key-takeaways-mindtree-investor-analyst-meet.pdf [Accessed 1 November 2021].

Nandakumar, I., 2012. $1 bn goal: How Mindtree sorted out its problems and emerged stronger Read more at: https://economictimes.indiatimes.com/1-bn-goal-how-mindtree-sorted-out-its-problems-and-emerged-stronger/articleshow/20522076.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst. *Economic Times*, [online] p.1. Available at: https://economictimes.indiatimes.com/1-bn-goal-how-mindtree-sorted-out-its-problems-and-emerged-stronger/articleshow/20522076.cms?from=mdr [Accessed 28 October 2021].

Nevatia, D., 2021. Decoding digital transformation. *Fortune India*, [online] Available at: https://www.fortuneindia.com/opinion/decoding-digital-transformation/105495 [Accessed 2 November 2021].

PA Wealth, 2021. Mindtree Ltd: IT Stock to look into. Available at: https://blog.pawealth.in/2021/05/27/mindtree-ltd-it-stock-to-look-into/ [Accessed 28 October 2021].

PA Wealth, 2021. L&T Group: Know about its businesses. Available at: https://blog.pawealth.in/2021/06/14/lt-group-know-about-its-businesses/ [Accessed 28 October 2021].

Pujadas, C., 2016. *APPLICATION OF DATA SCIENCE TO REDUCE EMPLOYEE ATTRITION*. [ebook] Available at: https://core.ac.uk/download/pdf/288499731.pdf [Accessed 3 November 2021].

Sangani, P., 2021. Mindtree sees opportunity for NxT Digital acquisition across verticals Read more at: https://economictimes.indiatimes.com/tech/information-tech/mindtree-sees-opportunity-for-nxt-digital-acquisition-across-verticals/articleshow/84522393.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst. *Economic Times*, [online] Available at: https://economictimes.indiatimes.com/tech/information-tech/mindtree-sees-opportunity-for-nxt-digital-acquisition-across-verticals/articleshow/84522393.cms [Accessed 2 November 2021].

SN Subrahmanyan, 2019. *Mindtree will continue to have independent management, unique culture*. [online] Available at: https://www.moneycontrol.com/news/business/companies/mindtree-will-continue-to-have-independent-management-unique-culture-4208651.html [Accessed 28 October 2021].

Yahia, N., Hlel, J. and Colomo-Palacios, R., 2021. From Big Data to Deep Data to Support People Analytics for Employee Attrition Prediction. *IEEE Access*, [online] 9, pp.60447-60458. Available at: https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=9409047 .

.