

# IMI disha

*The Guiding Light for Management Thinker*

## **Contribution of Corrugated Cardboard as Packing Material**

**Mr. Ankit Sharma, Ms. Priyanshi Joshi,  
Ms. Shreya Joshi**

## **Issue Categorization Machine Learning Model using Azure ML**

**Mr. Jyottheswar, Dr. Manohar Kapse,  
Dr. Joseph DuraiSelvam**

## **Evaluation of Management Quality of Indian Banks**

**Dr. A.K. Singh, Mr. Samir Dubey**

## **Application of TOPSIS Method**

**Mr. Arnav Chowdhury, Dr. Ajay Malpani**

## **EMOTIONAL COMMITMENT : A DRIVE TO WORK ENGAGEMENT**

**DR. RAJESHWARI GWAL  
DR. ANANT GWAL**

## **ROLE OF PROFESSIONAL EDUCATION IN ENHANCING GRIT AMONG STUDENTS**

**DR. PARUL SHARDA**

## **IMI DISHA CASE STUDY: BHANWARILAL MITHAIWALA**

**Ms. RANJITA DAS SONI  
Mr. ABHIRAJ SINGH CHAUHAN**



**INDORE MANAGEMENT INSTITUTE  
AND RESEARCH CENTRE**

[www.imidisha.com](http://www.imidisha.com)



“Rethinking  
the role of management  
education in developing a new  
locus of Research”

## Research Paper:

- 1. Contribution of Corrugated Cardboard as Packing Material in Logistic Under Economic and Technological Consideration. 7-12**  
*Mr. Ankit Sharma, Ms. Priyanshi Joshi, Ms. Shreya Joshi*
- 2. Issue Categorization Machine Learning Model using Azure ML 13-30**  
*Mr. Jyotheeswar, Dr. Manohar Kapse, Dr. Joseph DuraiSelvam*
- 3. Evaluation of Management Quality of Indian Banks 31-41**  
*Dr. A. K. Singh, Mr. Samir Dubey*
- 4. Study on the Application of TOPSIS Method to Rank the Best Alternatives of Compact Sedan Cars in India 42-47**  
*Mr. Arnav Chowdhury, Dr. Ajay Malpani*
- 5. Emotional Commitment : A Drive to Work Engagement 48-57**  
*Dr Rajeshwari Gwal, Dr Anant Gwal*
- 6. A Study on the Role of Professional Education in Enhancing GRIT Among Students: with reference to Indore City. 58-64**
- 7. Case Study: 65-69**  
*Ms. Ranjita Das Soni, Mr. Abhiraj Singh Chauhan.*

## EDITORIAL TEAM

### Chief Editor

**Dr. A K Singh**

(Indore Management Institute and Research Centre)

### Editor

**Dr. S. N. Tripathi**

(IMS, Banaras Hindu University)

### Editorial Board

**Dr. Satayendra Kumar**

(Gujarat University)

**Dr. Sanjay Sharma**

(Indore Management Institute and Research Centre)

**Dr. B. B. Mishra**

(Department of Business Administration, Utkal University)

**Mr. Arun Sahay**

(Chairman Centre of Entrepreneurship, MDI Gurgaon)

**Dr. Manasranjan Dasmishra**

(Department of Economics, Bapujee College, Angul, Odisha)

**Mr. Mohit Raikwar**

(IT Consultant)

**Dr. Ninranjan Pani**

(Department of Public Administration,  
Utkal University)

**Dr. Vandna Nayak**

(IBCS Bhubaneswar)

**Dr. H.S. Cheema**

(Guru Nanak Institute of Management Studies)

**Dr. Manohar Kapse**

(Christ University, Bangalore)

**Dr. Anant Gwal**

(Acropolis Institute, Indore)

### Editorial Department

**Dr. Parul Sharda**

(Indore Management Institute and Research Centre)

**Dr. Reena Gupta**

(Indore Management Institute and Research Centre)

**Mr. Abhiraj Singh Chouhan**

(Indore Management Institute and Research Centre)

IMIdisha welcomes original high quality papers on management, business and organization issues from both academicians and practitioners. Paper based on theoretical/ empirical research / experience should satisfy not only the criteria for good quality research but also must show the practical applicability and/or policy implications of their conclusions. All research papers are first screened at the editors' level, and those considered of sufficiently high quality are double blind referred by high quality reviewers who ensure a high standard of academic rigor in all the research papers. For further details please visit the website [www.imidisha.com](http://www.imidisha.com). You can send your research papers in the prescribed format to [imidisha@gmail.com](mailto:imidisha@gmail.com) or hardcopy to

**The Chief Editor,**

**IMI Disha, Indore Management Institute  
and Research Centre,**

**418, Milinda Manor, RNT Marg,**

**Opposite to Central Mall, Choti Gwaltoli  
Indore**

**Phone: 8817777718**

**Editor**

**Dr. A K Singh**

## **EDITORIAL**

While I was going through the paper to be sorted out for this issue: I found one paper on use of management journals by faculty at business schools. The paper was quite interesting in terms of its relevance and result. Research papers act as that creative output in which the writers' personal thoughts and opinions are merged with theories from already established sources. This task may seem to be simple, but problems arise in organizing and writing the research paper. Generally, authors fail to research the general topic before they decide on thesis statement; they fail to provide a connection between the thesis statement and all of the topic sentences in the paper; they fail to support the paper with adequate information that is relevant with the titles of the paper; or they fail to correctly cite their sources. Achieving an optimum balance between pure research and the tangible innovation of new products based on research is the unique challenge managers are facing in a high tech research and development environment. The major challenge faced by the researcher is that they do not fully review all the information available. As a result, they may choose a topic that is too general or too specific for the number of pages required. For example, the topic of capital punishment may be appropriate for a 100 –page dissertation because there is a plenty of information available on the topic, and the length of the paper permits for an in depth discussion of the topic. However the general topic of capital punishment is too large for a 15-page paper. The length of the paper does not allow for everything to be covered. A related problem to connect the main points to the thesis statement is failing to provide adequate

the texts is a major one. Ultimately, completing a research paper takes time, efforts and proper planning. In order to prevent, major mistakes enough time should be given to do research and write the paper. The number of journals in the field of management has increased sustainably. Most of the good management institutes have started in-house publications to promote research by faculty members.

This issue is also an anthology of papers in all areas of management. One of the most exciting papers of Dr. Manohar Kapse has tried to explain the automation of the queries using machine learning algorithms. I and Mr. Samir Dubey have tried to evaluate management quality of Indian Banks. We observed that there is significant difference in the human resources of different sector of bank in the country. Dr. Ajay Malpani and Mr. Arnav Chowdhury; their research papers focuses on the application of TOPSIS method to rank the vehicles according to their properties. Mr. Ankit Sharma, Mrs. Priyanshi Joshi & Ms. Shreya Joshi have studied on industry execution, marketing, sales and product management thereby highlighting value drivers that may provide a competitive advantage to the business. Dr. Parul Sharda has tried to find out the association between academic activities and GRIT.

I hope you will find this issue much valuable and informative. Wish you a happy reading.....

**Dr. A. K. Singh**  
**Chief Editor**



## Executive Summary

### **Contribution of Corrugated Cardboard as Packing Material in Logistics Under Economic & Technological Consideration**

**Mr. Ankit Sharma, Ms. Priyanshi Joshi,**

**Mr. Shreya Joshi**

**L**ogistics defines a techno-economic function which balances the need for product safety, material use competence and the packaging material impact in the supply chain. The efficiency of packaging in logistics is considered together with environmental conditions in the processes of supplying, packing, handling, storing, and transport. The study of market trends has been a major parameter while using any product in any organization. Logistics needs a reliable outer protection for its goods in transit. Corrugated Cardboard provides a cost-effective and a sustainable covering making it an irreplaceable option under economic and technological aspects. This paper focuses on industry executions, marketing, sales, and product management thereby highlighting value drivers that may provide a competitive advantage to the business by corrugated cardboard and its usage in the logistics.

### **Issue Categorization Machine Learning Model using Azure ML**

***Mr. Jyotheeswar, Dr. Manohar Kapse, Dr. Joseph Durai Selvam***

**T**oday's service desk team would be receiving about hundreds of queries via messages, emails and calls per day. Thus there is a great need for more and more human manpower for routing of these queries towards concern department, which are supposed to handle those particular queries. The processes of routing queries require manpower, which is not that accurate because of various reasons. Thus, this problem requires a need for automation of receiving queries at the service desk and then routing these queries to appropriate department. This paper explains the automation of the queries using machine learning algorithms. In this paper emphasis is made to identify the best algorithm, which can be used for classification of queries. The various algorithms used are Multi-Class Neural Network, Decision Tree, Multi-Class Logistic Regression Techniques, etc. From the analysis we obtain best model accuracy in Multi-Class Neural Network method, with an overall accuracy of 81.32 %, Average accuracy of 96.26%, and Micro averaged precision of 81.32% and Micro averaged recall of 81.32%. This automation process helps in performing automation of ticket issuing and routing that queries to concern department by decreasing the waiting time and also decreasing the misclassification of ticket issuing.

## **Evaluation of Management Quality of Indian Banks**

*Dr. A. K. Singh, Mr. Samir Dubey*

In organizations all over the world, human resource was supposed to be the area where most cost cutting decisions were taken. Human resource was never taken so seriously until recent years. In the recent past human resource has changed to human capital and then improvised to intellectual capital. This all is the result of increasing contribution of service sector in the GDP of the countries all over the world more specifically in the developed countries and the newly developed nations. India is no exception to this change. There are studies all over the world which are proving human resources to be the most important resource which stood neglected till date. As of now as well, research and innovations in the sector of human capital or intellectual capital are in infancy only. In our research, we have tried to evaluate management quality of Indian Banks. We have used ANOVA for the purpose. Inter-sector comparison has been done with the help of students' "t" statistic. We observed that there lies significant difference in the human resources of different sector of banks in the country.

## **Study on the Application of TOPSIS Method to rank the best alternatives of Compact Sedan Cars in India**

*Mr. Arnav Chowdhury, Dr. Ajay Malpani*

Indian Automobile market is growing rapidly on day-to-day basis, and there is a huge demand of Compact Sedan Segment Cars among the potential customers. There are a few options on this segment and there

is a great confusion among the buyers too. This research paper will focus on four major options in this segment and rank them according to the properties of the vehicle by using TOPSIS method.

## **Emotional Commitment: A drive to Work Engagement**

*Dr. Rajeshwari Gwal, Dr. Anant Gwal*

Work engagement of female employees is crucial and rewarding for the employers as she is instrumental in setting a positive happy working environment in the organizations. Levels of engagement do not significantly differ in males and females. The current study tried to study the impact of various personality dimension extraversion, agreeableness, conscientiousness, emotional stability and openness on work engagement levels of Married vis-à-vis Unmarried working women in Indore city.

Results indicate a moderate Correlation between Personality and Work Engagement ( $r=.385$ ,  $p<0.05$ ). With Multiple Regression, when various personality dimensions were predicted it was found that Extraversion (Beta = 0.251,  $p<0.05$ ) and Agreeableness (Beta = 0.175,  $p<0.05$ ) were significant predictors. Conscientiousness (Beta = 0.175,  $p<0.05$ ) was a mild predictor, Emotional Stability (Beta = -0.092,  $p<0.05$ ) and Openness (Beta = -0.165,  $p<0.05$ ) were not a significant predictor.

**A Study on the Role of Professional Education in Enhancing GRIT Among Students: with reference to Indore City.**

***Dr. Parul Sharda***

**T**he Concept of GRIT was originally articulated by Duckworth et.al (2007), which explains that, it is not only the IQ which plays an important role in academic achievement, but it is the passion and perseverance which drives the student to be successful in all aspects of life GRIT is like running marathon of life, until get successful. But the question is what role the educational institutes are playing in improving GRIT among students?

According to Stanford University, growth mindset is required to be built for improving GRIT, and for that, the professional system should focus on helping and mentoring the students in defining their goal, make them learn the strategies to enhance focus up to 100%, nurture them to develop the listening skills to get the real insights about what they have done i.e getting feedback, and last but not the least is bounce back with corrected version of yourself. Through this study the researcher has tried to find the association between academic activities and GRIT. Regression is applied to understand the relationship of professional education and GRIT. The findings and implications of this study will be useful for professional institutes, academicians and researchers to better understand their role in improving growth mindset among students.

**Case Study:**

***Ms. Ranjita Das Soni,***

***Mr. Abhiraj Singh Chauhan***

**B**hanwarilal Mithaiwala a sweet food manufacture from the State of Madhya Pradesh, India has seen a considerable growth in the last two decades. From a small time operator to a strong regional brand, Bhanwarilal Mithaiwala had come a long way heartened by its success in the market of Mhow, Madhya Pradesh. ■



### **Contribution of Corrugated Cardboard as Packing Material in Logistic Under Economic & Technological Consideration**

***Mr. Ankit Sharma***

***Ms. Priyanshi Joshi***

***Ms. Shreya Joshi***

#### **Abstract:**

Logistics defines a techno-economic function which balances the need for product safety, material use competence and the packaging material's impact in the supply chain. The efficiency of packaging in logistics is considered together with environmental conditions in the processes of supplying, packing, handling, storing, and transport. The study of market trends has been a major parameter while using any product in any organization. Logistics needs a reliable outer protection for its goods in transit. Corrugated cardboard provides a cost-effective and a sustainable covering making it an irreplaceable option under economic and technological aspects. This paper focuses on industry executions, marketing, sales, and product management thereby highlighting value drivers that may provide a competitive advantage to the business by corrugated cardboard and its usage in the logistics.

**Keywords:**

Corrugate, Cardboard, Packing Material, Logistics, Economic and Technological Consideration

**Introduction:**

A three-layered brown craft paper produced from pine trees is a key ingredient of corrugated cardboard. The material is stiff, lightweight and tough. The corrugated cardboard undergoes various tests like glue strength, bursting strength, compression, and highly accurate dimensional tests to assure its quality (Madehow, 2018). The ability of a packaging is determined by how efficiently it protects and how the quality is conserved in its transit till its final use, and lastly by the cost of packing (Ernst et.al., 1975). To enable an efficient and sustainable supply chain an integrated packaging logistics is an essential factor. Size and density of packages determine the transport and storage costs. Efficient size and shape standardization of packaging can cut the cost of logistics from the sales revenues. Logistics defines a techno-economic function that focuses on minimizing the cost and performance of transport (Hellstrom et.al., 2011). The total cost analysis is considered depending on the quality of the services offered by packaging solution within variable packaging functions.

Apart from the usage of corrugated cardboard packaging in the E-Commerce industry, it has been widely used in other industries. Corrugated cardboard Packaging market is evolving at a great pace. This market is categorized into processed foodstuffs, personal care, domestic care,

drinks, electronics goods, pharmaceuticals, glassware and ceramics, fresh food and produce, paper products, tobacco, wood and timber products, textiles, direct mail and dispatch, transport, including footwear and furniture. The demand for personal and household care has seen immense growth over the past few years owing to the high demand for cosmetics and personal care products. This is driving the use of corrugated packaging widely in cosmetics, personal care product, and home furnishing packaging.

The corrugated cardboard or fiberboard is used worldwide in its packaging due to its various substantial competitive advantages.

**High mechanical resistivity:** The products developed and transported are protected due to the mechanical actions by the structure of the container. The package should be preserved against chemical and physical damages. Kraft papers have a central fluting material between the upper and lower layers to reduce severe damages and crushing. The ridges provide an additional layer of cushioning.

**Lightweight material:** The weight of the box is much lighter due to the transformation from the tree to the Kraft paper, which results in lowering the transportation volume as well as the cost. The thickness of the material does not compromise on its weight, the reason being the gaps of air within the ridges.

**Reduced production cost:** The production costs are specifically lowered due to the material used in various segments of the

packing sector. These are the cheapest form of packaging which reduces the final price on account included with packaging leading to an expected boost and its demand for packaging purposes.

**Circular by nature (Recyclable):** The packages made from the corrugated cardboard can be recycled into new packaging after they are used once and disposed of result the least impact on the environment. Sustainability is of top priority to reduce the carbon footprints into the ecosystem. Some fiber-boards are made from 100% recyclables, giving an average of 70-90% eco-friendly. Due to the properties like recyclability, reusability of corrugated cardboard, it emerges as huge input in creating and maintaining the green supply chain PS (2018).

**Optimization:** Packaging fits mostly to any business and product by creating their own customizations and specifications. Proper space utilization and stacking of products reduce the transport frequencies that results in lesser traffic on roads and reduced atmospheric pollution, which turns out to be a real economic impact of using corrugated cardboard.

**Traceability:** The recent innovations in logistics have included Radio Frequency Identification-Enabled Packaging which can easily trace the parcel's location in its transit. This makes it easy for the identification of the procedure at any given time in the logistics process.

**Informative:** The visibility of a packaging makes it a clear and an authentic parcel in its

transit. The carton should be self-descriptive by the data necessary for the transit like codes, signs, source and the destination. This feature makes it an add-on to the marketing of the firm.

**Cost analysis procedures:** Proper stance on how packaging cost is affected, we should be examined as an integrated part of the logistics as well as SCM cycles from raw material to the disposal of the used packaging. It results in a comprehensive cost assessment of packaging related solutions. The final cost is a comprehension of all services and utilities linked with the packaging procedure with respect to money, and compare them with the packaging cost. The cost-benefit analysis utilizes a quantitative approach to analyze the cost. Services and utilities that packaging provides, are computed as profits which are compared with costs by either dividing them by the cost or subtracting the cost which has their own economic outcomes. It is almost impossible to enumerate all the economic effects on the processes and on the system as it has various hidden and latent costs associated with the visible and necessary ones.

## **A study of Market Trends Related to the Use and Growth of Corrugated Cardboard**

### **An overview:**

- There has emerged important drivers such as E-Commerce, Digital Printing, and Sustainability, are now running the corrugated cardboard market. Corrugated packaging is contributing about \$20 billion worth of corrugated cardboard packaging material into E-

Commerce. And this E-Commerce fulfilment comprises consumer electronics, books and media products, fashion, toys, hobbies, and sports equipment. The E-Commerce giants' use various corrugated packaging as per the weight of the product like single face, single-wall, double wall and triple wall Chrzan (2018). Providing us with an opportunity to grow the logistics business into E-Commerce industry also. The driver Digital Printing has a major role in creating the corrugated cardboard packaging industry. There prevails a boom in trends of customized and personalized packaging in the previous decades. The customizations in run-lengths, costs, and creative designs are creating room for small and mid-size enterprises availing them a market share an existence in the market and social media PS (2018). The figure below describes the sales of the corrugated boxes in the year 2017-2022 which according to reports is expected to rise by 3.6%. The sell is anticipated to rise further to US\$115.15 by the end of 2022.

Figure-1 Global Corrugated Box



**Source: Transparency  
Market Research 2017**

- Corrugated box sales are expected to register positive CAGR of around 21.8% during the period FY'2018-FY'2023 Ken (2018). The corrugated packing for display printing packs POPs and distributor and the surfacing of E-Commerce industries are expected to show a positive inclination in the usage in the logistics market. A steep growth of the E-Commerce business within budding Asian economies will raise the need for corrugated packaging demand during the projection period persistence market research (2018). The rise in demand for secure and cushioned packaging in logistics will augment the growth corrugated box promotion.
- Driven by these factors, experts are of view of an increase in corrugated cardboard packaging industry to reach \$294.3 billion by 2023 PS (2018). In other words, the industry has forecast to grow 3.5% to 4% annually, a new study SmithersPira 2018.
- Figure 2 depicts a requirement for cardboards to amplify the manufacturers to develop sustainable and high-quality products not only in logistics but in various sectors. Among other regional markets of North America and Europe are likely to report a noticeable increase in the demand for corrugated boxes over the decade due to a significant increase in E-Commerce and logistics sector and the subsequent preference for packaging. The existence of chief vendors anticipates the benefits of these regional markets in the following years.

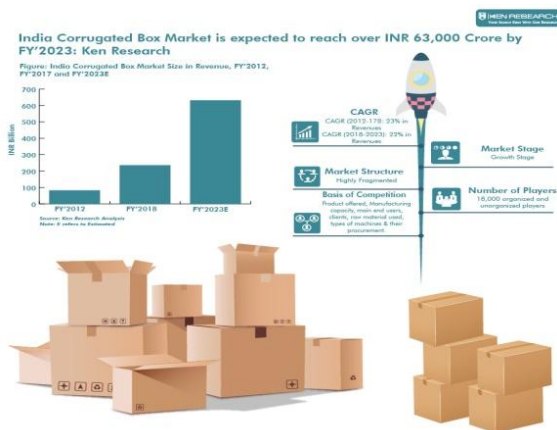
**Figure:**  
**Regional Packaging Market Revenue.**



**Source: Persistence Market Research, 2018**

The comprehensive market as studied by Ken research in 2018 estimates the corrugated cardboard market to rise over INR 630000 Crore by the year 2023 which is a steep rise from the year of research in 2018. The prevalent reasons being logistics and packaging, the growth of E-Commerce and mid-size companies of each sectors Ken research 2018.

**Figure 3: Indian Market Analysis of Corrugated Cardboard**



**Source: Ken Research 2018**

## Conclusion:

It is significant to invest in technology to automate the production procedure. The industry is gliding towards a capital-intensive production while there is a need to

attain economies of scale, which can be achieved by diversification in a variety of forms of packaging. The packaging must be sustainable, protective and productive. It should satisfy the current needs of the organization while should scale the future vision through a keen focus on qualitative and quantitative measures. The organization should undergo proper analysis based on aspects including introduction and genesis, market size by revenue, market segmentation, customer demands, and satisfaction.

## References:

1. Madehow. (2018). How corrugated cardboard is made - material, manufacture, making, used, processing, parts, structure, procedure. Retrieved from: <http://www.madehow.com/Volume-1/Corrugated-Cardboard.html>
2. Ernst, G. F., & Faulkner, W. P. (1975). *U.S. Patent No. 3,890,762*. Washington, DC: U.S. Patent and Trademark Office.
3. Hellström, D., & Nilsson, F. (2011). Logistics-driven packaging innovation: a case study at IKEA. *International Journal of Retail & Distribution Management*, 39(9), 638-657.
4. Dominic, C. A., Östlund, S., Buffington, J., & Masoud, M. M. (2015). Towards a conceptual sustainable packaging development model: a corrugated box case study. *Packaging Technology and Science*, 28(5), 397-413.

5. Persistence Market Research. (2018). Corrugated Packaging Market- Global Trends, Growth, & Forecast to 2026.  
  
Retrieved from:  
  
<https://www.persistencemarketresearch.com/market-research/corrugated-packaging-market.asp>
6. Bielecki, M., Chmielewska-Wurch, A., Damiecki, T., Patalan, B., Sloma, M., &Zdzieblo, S. (2011). General issues and the recommended standards for corrugated board and corrugated board packaging. *Association of Polish Paper-makers*. Bielecki et.al., 2011
7. Ken research. (2018). India Corrugated Box Market Size, Rise in Kraft Paper Prices, Type of Ply Corrugated Box India, 3 Ply Corrugated Box India, 5 Ply, 7 Ply, 9 Ply-Ken Research. Retrieved from  
  
<https://www.kenresearch.com/blog/2018/05/india-corrugated-box-market-is-expected-to-reach-over-inr-63000-crore-by-fy2023-ken-research/>
8. Chrzan, J. (2018). Corrugated packaging market forecast to increase from \$315 billion to \$380 billion by 2023 Packaging World.  
  
Retrieved from:  
  
<https://www.packworld.com/research/paper/trends-and-issues/e-commerce/corrugated-packaging-market-forecast-increase-315-billion-380>.
9. PS (2018). Corrugated Packaging Market to Reach \$294.3 Billion by 2023. Retrieved from:  
  
<https://www.psmarketresearch.com/market-analysis/corrugated-packaging-market> ■



### Issue Categorization Machine Learning Model using Azure ML

*Mr. Jyotheeswar*

*Dr. Manohar Kapse*

*Dr. Joseph Durai Selvam*

#### **Abstract:**

Today's service desk team would be receiving about hundreds of queries via messages, emails and calls per day. Thus there is a great need for more and more human manpower for routing of these queries towards concern department, which are supposed to handle those particular queries. The processes of routing queries require manpower, which is not that accurate because of various reasons. Thus, this problem requires a need for automation of receiving queries at the service desk and then routing these queries to appropriate department.

This paper explains the automation of the queries using machine learning algorithms. In this paper, emphasis is made to identify the best algorithm, which can be used for classification of queries. The various algorithms used are Multi-class Neural Network, Decision Tree, Multi-Class Logistic Regression Techniques, etc. From the analysis we obtain best model accuracy in Multi-Class Neural Network Method,

with an overall accuracy of 81.32 %, Average accuracy of 96.26%, Micro averaged precision of 81.32% and Micro averaged recall of 81.32%. This automation process helps in performing automation of ticket issuing and routing that queries to concern department by decreasing the waiting time and also decreasing the miss classification of ticket issuing.

**Keyword:** Machine Learning, Text Analytics, Text Classification, Azure ML, Multi Class Logistic Regression, Neural Network.

## Introduction

Text analytics converts text into numbers, and numbers, in turn, bring structure to the data and help to identify patterns. The more structured the data, the better the analysis, and eventually the better the decisions would be. It is also difficult to process every bit of data manually and classify them clearly. This led to the emergence of intelligent tools in text processing, in the field of natural language processing, to analyze lexical and linguistic patterns (Brindha et al., 2016).

Clustering, classification, and categorization are major techniques followed in text analytics (Vasa, 2016). It is the process of assigning, for example, a document to a particular class label (say "History") among other available class labels like "Education", "Medicine" and "Biology". Thus, text classification is a mandatory phase in knowledge discovery (Vasa, 2016). The aim of this research paper is to analyze various text classification techniques employed in practice, their spread in various application domains, strengths, weaknesses, and current

research trends to provide improved awareness regarding knowledge extraction possibilities. Automatic text classification has always been an important application and research topic since the inception of digital era. In present era, text classification is an essential analytics tool due to very large amount of availability of text, in the form of feeds, tweets, feedbacks and so on, which we deal within each and every fields. Whether, it is IT, Medical, Marketing, Customer Care, etc. (ThangarajM, 2018)

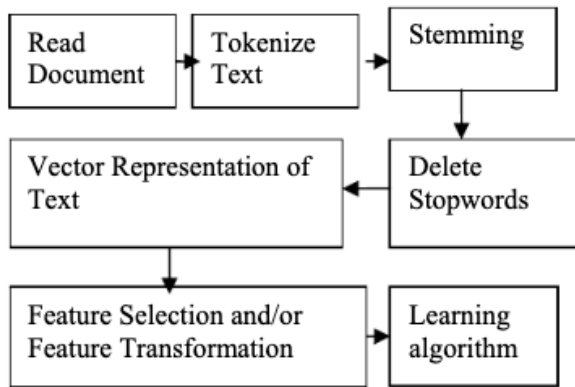
Text classification is the process of categorizing text into organized groups based on their content. In the context of machine learning, text classification is a supervised as well as unsupervised learning task that categorizes a text document into one of a predefined set of classes (categories).

The supervised categorization is primarily based on keywords present in the text. Supervised learning discovers a relation between input and output pairs through the use of a labeled dataset. A labeled dataset consists of a set of examples with associated class labels. One of the basic tasks in Natural Language Processing (NLP) is automation of text classification.

In this research paper, the application of text classification is used to automatically categorize the query received from the users at the Service Desk team of company and to automate and deploy the process on Web service deployment. The process of text classification as per multi-class neural network is explained as per the figure. Training and Evaluate model and overall model flow before deployment

**Figure No. 1.**

**Flow Chart of Text Classification**



**Source: As per Azure ML Documentations**

In this paper, multi-class text classification approaches is used. Statistical topic modeling is applied for multi-label document classification, where each document gets assigned to one or more classes. It became an interesting topic in the past decade as it performed well for datasets with increasing number of instances for an entity (Rubin, Chambers, Smyth, & Steyvers, 2012).

When the number of documents increased, the computational complexity also increased (Stas, Juhar, & Hladek, 2014). ML is often seen as an offshoot of statistics as far as data mining is concerned. It employs advanced models to make decisions based on its own cognizance (Du, 2017; Ranjan & Prasad, 2017). However, a purely statistical and purely ML approach is considered less competent, therefore a hybrid approach is usually preferred (Srivastava, 2015).

Artificial Immune System (AIS) based self-adaptive attribute weighting method for Naive Bayes classification uses immunity theory in Artificial Immune Systems to search optimal attribute weight values

(Wu.al, 2015). Logistic regression is an efficient probability-based linear classifier. The problem of over fitting (data model memorizes the dataset instead of the learning procedure.) could be solved by using penalized logistic regression in active learning algorithm (Wang & Park, 2017).

A proper instance selection technique could finish half of the knowledge discovery procedure. A new instance selector based on Support Vector Machine (SVM) called, support vector oriented instance selection is suggested to remove noisy data (Tsai & Chang, 2013). Some researchers analyzed the decision trees' role in multi-valued and multi-labeled data. This type of data makes it difficult to pick a particular set of attributes. It is also difficult to calculate similarity scores multi-valued and multi-labeled data (Yi, Lu, & Liu, 2011).

The decision tree algorithms calculate similarity scores comprehensively and accurately. It has been proven efficient for scenarios where synchronization among elements is less. To overcome the problem from the order of classes in rule learning, Complexity-based Parallel Rule Learning algorithm is suggested (Asadi & Shahrabi, 2016). In a different setting, multi-class classification is tried by com- Text Classification Techniques 120 binding kernel density estimation with k-NN (Tang & Xu, 2016). It improves the weighting principle of k-NN, thereby increasing the accuracy of classification. It has also been proven efficient for complex classification problems.

The role of ANNs in high dimensional and large data is significant. Neural classifiers

such as fuzzy adaptive resonance associative maps are scalable for large volumes of data (Benites & Sapozhnikova, 2017). Unsupervised learning provides so many research opportunities in workflow management and task scheduling, particularly in the field of big data (Zhoua, Pana, Wanga, Athanasios, & Vasilakos, 2017).

A modified Self-Organizing Map (SOM), Kernel-based SOM (KSOM) is introduced to convert the multi-class problems into binary trees, in which the binary decisions are made by SVMs. For consistency between the SOM and SVM, the K-SOM utilizes distance measures at the kernel space, not at the input space. Also, by allowing overlaps in the binary decision tree, it overcomes the performance degradation of the tree structure, and shows classification accuracy comparable to those of the popular multi-class; SVM approaches with “one-to-one” and “one-to-the others”. Rosario and Hearst [2005] addressed the problem of multi-way relation classification, applied to identification of the interactions between proteins in bioscience text.

### **Problem Statement:**

To automatically categorize the given query received from Service Desk department into appropriate categories:

### **Objectives:**

1. Creation of Automatic Service Desk Ticket Issue Categorizer Model
2. Deployment of Web Service Model

### **Data Collection:**

The organization had collected six months of data from November to March 2019 on eleven attributes. Out of these eleven attributes, only two attributes were considered for text analysis, because of insights, and information contained in them. These attributes are short description and category fields. The **Short Description** is used as input parameter in the model building for predicting the appropriate output category. The short description feature describes the incident that was encountered by the user and needs a proper resolution for it. Whereas the category feature is used as the output parameter field for classification of the given query into respective category.

The considered categories are listed below with their functioning arenas:

The eight category labels are Application, Application Software, Application ISA, Network, Server Software, Hardware, PC Software, and Others.

**Table 1. Description of the Dataset**

Application	The queries that belongs to application issues such as Crome, web concur application related key words etc. are categorized into application.
Application software	Application related configuration queries are categorized into Application Software.
Application ISA	Includes queries are of Application ISA (Industry Standard Architecture) related.
Hardware	Includes laptop, printer, battery, mobile phone related etc. are categorized into Hardware.
PC Software	Includes Google chrome issue, console, internal software those are pre-installed on PC is categorized into PC Software.
Network	Includes access, connectivity, domain, VPN, login credentials and interlinked etc. are categorized into Network.
Server Software	Includes authentication error, server related etc. are categorized into Server Software
Other	Include other queries and not particular queries are categorized into Other.

**Source: As per Researcher (Data not shown due to Confidential issues)**

**Workflow:**

This research work has two stages

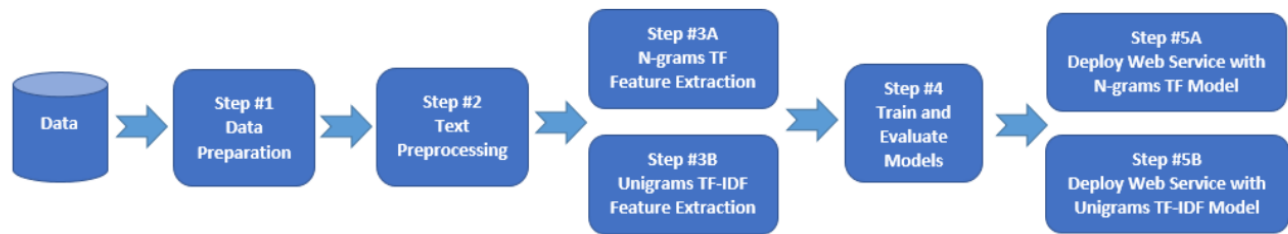
Stage 1: Train model with data and save trained models &

Stage 2: Create an experiment using the trained models and deploy it as web service

The following steps are involved in accomplishing the above two stages:

1. Import Data
2. Data Pre-processing
3. Text Pre-processing
4. Feature Engineering
5. Train and Evaluate Model
6. Save Trained Model and
7. Web Service Deployment

**Figure No. 2. Experiment Work Flow**



**Source: Unknown**

### **Import Data:**

Import data module of this experiments loads data from Azure Blob Storage, we can replace it with their own datasets like a file on a local system or online stores like Azure SQL Storage, etc.

Data set should be of CSV, TSV and Plain Txt but cannot be of type Excel (xls) type, as I have received excel data file and later converted the given data into CSV format and loaded it on the azure data storage.

### **Data Pre - Processing:**

As the given data was not proper form and it was manually categorized the corresponding short description columns to appropriate categories, as the given data is too huge which consists of six months of data which involves 46,394 rows and data pre- processing was a crucial step in arriving at the output.

### **Text Pre - Processing:**

Used Pre-process Text module to simplify results and improve accuracy.

The various operations which are done under pre-processing step on the input variable-

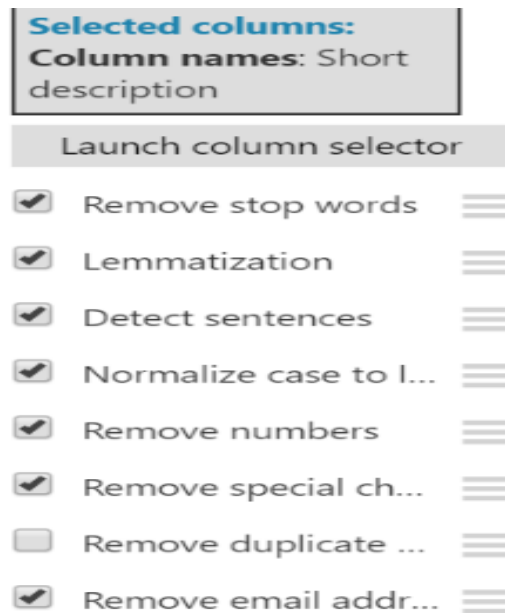
Short Description are:

- Removal of stop words – To remove stop words which are redundant
- Lemmatization – In order to get it into root word structure form
- Removal of numbers – As some queries involved numbers which are not required
- Normalizing case to lower case- For the model to be insensitive of the letter cases used



- Removal of special characters – To ignore the special characters which are typed unknowingly or which has no importance
- Detecting sentences- For sentence detection which helps for the model building and identification of the appropriate category
- Removal of email addresses and URL's – As some queries involves email ids of senders, URL's of particular links which are not working in order to remove those

**Figure 3. Text Pre-process block**



**Source: Azure Dashboard**

Here we select the Short Description Column and perform pre-processing text and check all the operations that are need to be done, here we haven't checked the remove duplication within the row because it might add value for the model building.

### **Feature Engineering:**

Feature hashing is used to convert variable-length text to equal-length numeric feature vector. The objective of using feature hashing is to reduce dimensionality. Feature hashing, also known as the hashing trick, is a fast and space-efficient way of vector zing features, i.e. turning arbitrary features into indices in a vector or matrix. It works by applying a hash function to the features and using their hash values as indices directly, rather than looking the indices up in an associative array.

**Figure 4 Feature Hashing Block**

Feature Hashing

Target column(s)

**Selected columns:**

**Column names:**

Preprocessed Short description

Launch column selector

Hashing bitsize

N-grams

**Source: Azure Dash Board**

Classification time and complexity of model depend on a number of input features. Here we have selected the Pre-processed Short description column which was the resultant of the previous block and have used N-gram value of 2 and hashing bit size of 10, it means it would look for  $2^{10}$  desired feature to obtain from the model.

### Split Data:

Data splitting is useful in model building and effective data management and in order to train and testing of the model and how the performance of the model.

**Figure No. 5. Spilt Data Block**

Split Data

Splitting mode

Fraction of rows in the f...

☒ Randomized split

Random seed

Stratified split

## **Source: Azure Dashboard**

In this experiment randomized 80-20 splitting technique is used for training and testing of the data model.

### **Train and Evaluate Model:**

In this experiment, we have worked on Multi-Class Logistic Regression, Multi-Class Decision Forest and Multi-Class Neural Network.

#### **Multi-Class Logistic Regression:**

Multinomial logistic regression is a classification method that generalizes logistic regression to multi-class problem, i.e. with more than two possible discrete outcomes. That is, it is a model which is used to predict the probabilities of the different possible outcomes of a categorically distributed dependent variables, given a set of independent variables (which may be real-valued, binary-valued, categorical-valued, etc.).

Where the inputs for the trained model are one from split dataset and the other from Multi-Class Logistic Regression.

#### **Multi-Class Decision Forest:**

The decision forest algorithm is an ensemble learning method for classification. The algorithm works by building multiple decision trees and then voting on the most popular output class. Voting is a form of aggregation, in which each tree in a classification decision forest outputs, a non-normalized frequency histogram of labels. The aggregation process sums these

histograms and normalizes the result to get the “probabilities” for each label. The trees that have high prediction confidence have a greater weight in the final decision of the ensemble.

Decision trees, in general, are non-parametric models, meaning they support data with varied distributions. In each tree, a sequence of simple tests is run for each class, increasing the levels of a tree structure until a leaf node (decision) is reached. Where the inputs for the trained model are one from split dataset and the other from Multi-Class Decision Forest.

#### **Multi-Class Neural Network:**

Neural networks are also popular among cases where a hierarchical multi-label classification approach is required. This kind of classification is complex as each sample may belong to more than one class and predictions of one level is fed as inputs to next level to make a final decision (Cerri, Barros, & Carvalho, 2014). Also in a similar setup, linear regression could be used for feature selection in an ensemble boosted classifier (Nie, Jin, Fei, & Ma, 2015). Neural network forms the base of the ensemble with the help of composite stumps.

A neural network is a set of interconnected layers. The inputs are the first layer and are connected to an output layer by an acyclic graph comprised of weighted edges and nodes.

Between the input and output layers, you can insert multiple hidden layers. Most

predictive tasks can be accomplished easily with only one or a few hidden layers. However, recent research has shown that Deep Neural Networks (DNN) with many layers can be very effective in complex tasks such as image or speech recognition. The successive layers are used to model increasing levels of semantic depth.

The relationship between inputs and outputs is learned from training the neural network on the input data. The direction of the graph proceeds from the inputs through the hidden layer and to the output layer. All nodes in a layer are connected by the weighted edges to nodes in the next layer.

To compute the output of the network for a particular input, a value is calculated at each node in the hidden layers and in the output layer. The value is set by calculating the weighted sum of the values of the nodes from the previous layer. An activation function is then applied to that weighted sum

**Figure No. 6. Multi Class Neural Network Block**

**▲ Multiclass Neural Network**

Create trainer mode  
Single Parameter ▼

Hidden layer specification  
Fully-connected case ▼

Number of hidden nodes

The learning rate

Number of learning iter...

The initial learning wei...

The momentum

The type of normalizer

### Source: Azure Dashboard

The following changes have been made to this model:

Here we have invoked the default Multi-Class Neural Network, the learning speed is increased to 0.9, Number of hidden layers are increased to 700, number of iterations have been decreased to 15, initial learning weight is increased to 0.25, normalize type is changed to binning type.

### Scoring Model:

Scoring is widely used in machine learning to mean the process of generating new values, given a model and some new input. The generic term "score" is used, rather than "prediction," because the scoring process can generate so many different types of values:

- A list of recommended items and a similarity score.
- Numeric values, for time series models and regression models.
- A probability value, indicating the likelihood that a new input belongs to some existing category.
- The name of a category or cluster to which a new item is most similar.
- A predicted class or outcome, for classification models.

In this step the obtained output from train model is connected as one input and other input from splitted data is connected to score model.

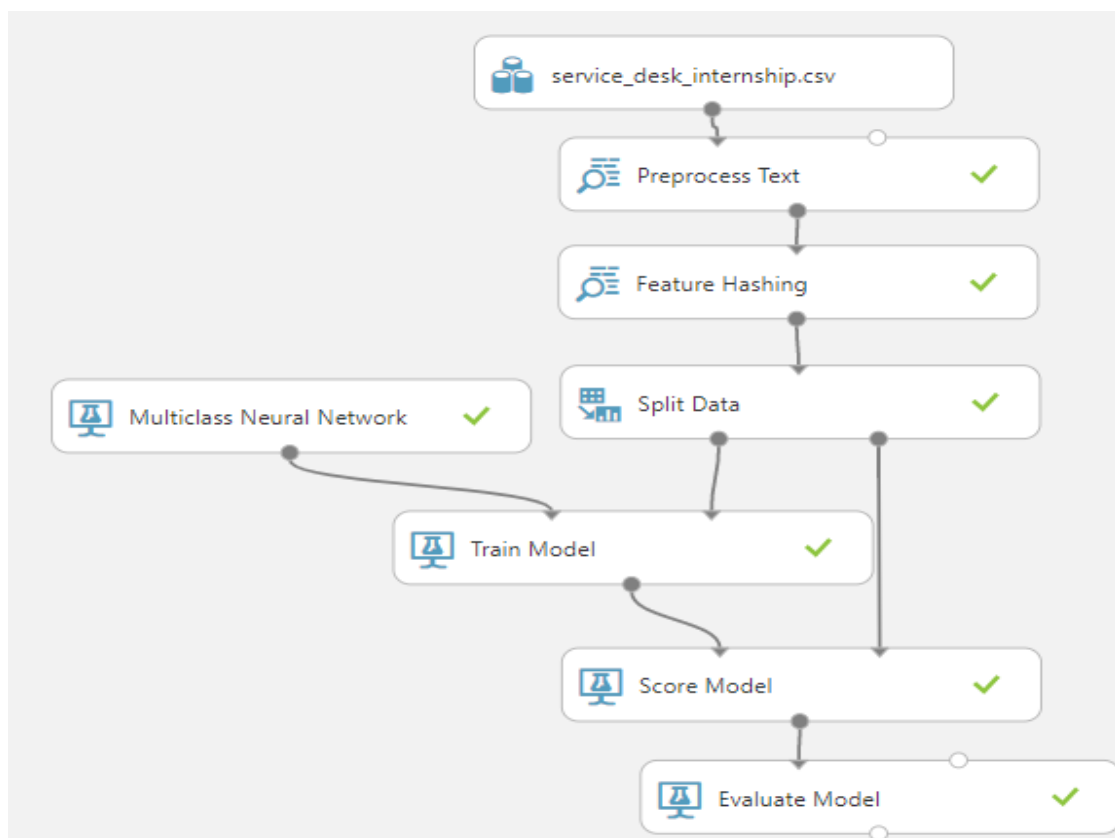
### Evaluate Model:

Evaluate Model module in Azure Machine Learning Studio to measure the accuracy of a trained model. You provide a dataset containing scores generated from a model, and the Evaluate Model module computes a set of industry-standard evaluation metrics. Inputs for this block are from the output from the score model block

### Save Trained Model:

Hence the overall train model with data is done and save the model and run the model and look for proceed further for stage 2, to create an experiment and for Web service deployment. The overall model flow diagram is as given in the flow chart.

**Figure 7. Training and Evaluate model and overall model flow before deployment**



### Source : Azure DashBoard

Stage 2: Create an experiment using the trained models and deploy it as web service. In this stage we create an experiment and run the model and check for any errors if present and proceed further, next step is to set up Web service (Predictive Experiment), then run the predictive model and then perform deploy web service.

**Figure 8. Web Service Deployment Model**



**Source: Azure Dashboard**

The model is ready and web service deployment is done and now we could test the model. If needed we could use batch execution when the data set is too huge and for enterprise version if not we could go by typical web service deployment using API configuration.

**Figure 9. Azure Output Dialog Block**

Enter data to predict

SHORT DESCRIPTION

CATEGORY

Enter Web Service Parameters

☐ APPEND SCORE COLUMNS TO OUTPUT



### Source: Azure Dashboard

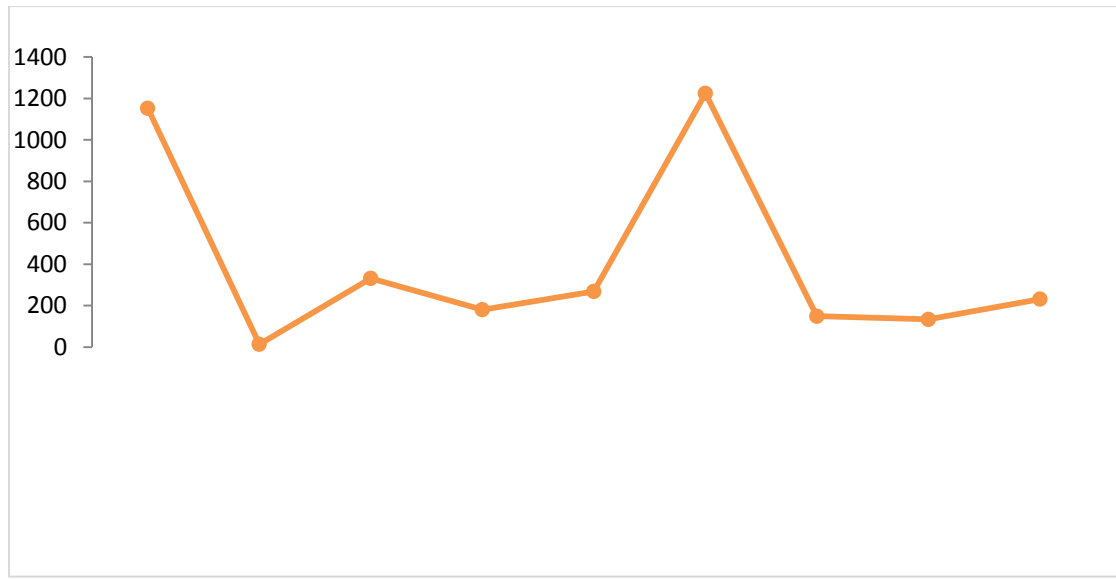
Hence the model is done and gives the query in the Short Description blank space and make sure you uncheck the Append Score Columns to outputs to display output in the same page.

- Data set which is given is not accurate and modifications has been done to make the model more accurate- the categories which are assigned with respect to the short description columns are randomly assigned without any technical knowledge.
- A **Master Dataset** was created which comprises of six months of data – it contains 21 attributes and **46,394** rows
- Have identified that **Short Description** and **Category** attributes are the prominent fields to focus upon to in order to arrive at project objectives.
- Figured it out that the required model to be of multi-class classifier type, since the output has eight categories. Hence went with Multi-Class Regression, Multi-Class Decision Forest and Multi-Class Neural Network.
- Due to **Deployment Flexibility and Advanced Model** blocks availability have choose Microsoft Azure Machine Learning.
- Accuracy of Regression model is very less – obtained an overall accuracy of about 70%, hence we went for the other prediction algorithm.
- While performing using **Multi Class Decision Forest** obtained overall accuracy was about **95%** but the classified categories in the webservice deployment output was displaying misclassified categories.
- **Multi-Class Neural Network** gave an overall accuracy of 81.13% and average accuracy of **96.26%**.
- Though average accuracy is higher, still overall accuracy was slightly lesser due to the fact that same keyword is used in multiple categories and this has caused for the lesser overall accuracy value.
- Though Multi Class Neural Network's overall accuracy was slightly lesser than Multi Class Decision Forest but the outputs classified are very accurate.
- Key Findings about Multi-Class Neural Network model are:
- The model works optimum when the training dataset ratio is between 75-85 failing which model accuracy is lowered.
- When initial learning speed is between 0.7 to 0.9 it works better at 1.0 the model's accuracy is lowered.
- Binning Normalizer works better than any other normalizer type for this data model.
- When initial learning weights are 0.15 to 0.25 the higher is the accuracy of the model.
- Web service deployment can be done directly on the streaming data and can be embedded. Into any software with the help of API which is obtained from the Azure ML model.

### **Recommendations:**

- Almost all the queries come from Application and Network related categories and a special team has to be formed effectively to resolve these issues.

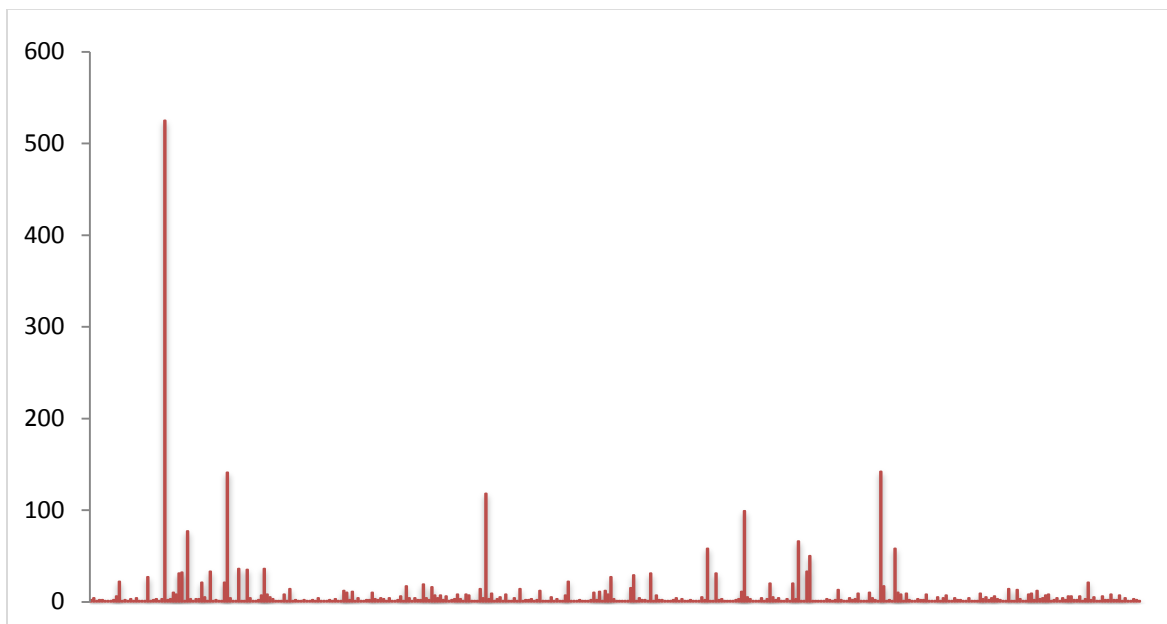
### **Graph1. Category Wise Count**



**Source: As calculated by Researcher (Data not shown due to confidential issues)**

- Most of the queries come from Bangalore, India followed by Sao Paulo, Brazil.
- It would be good, if more importance is given to this particular areas and special team to resolve queries in those particular zones for faster query resolution.

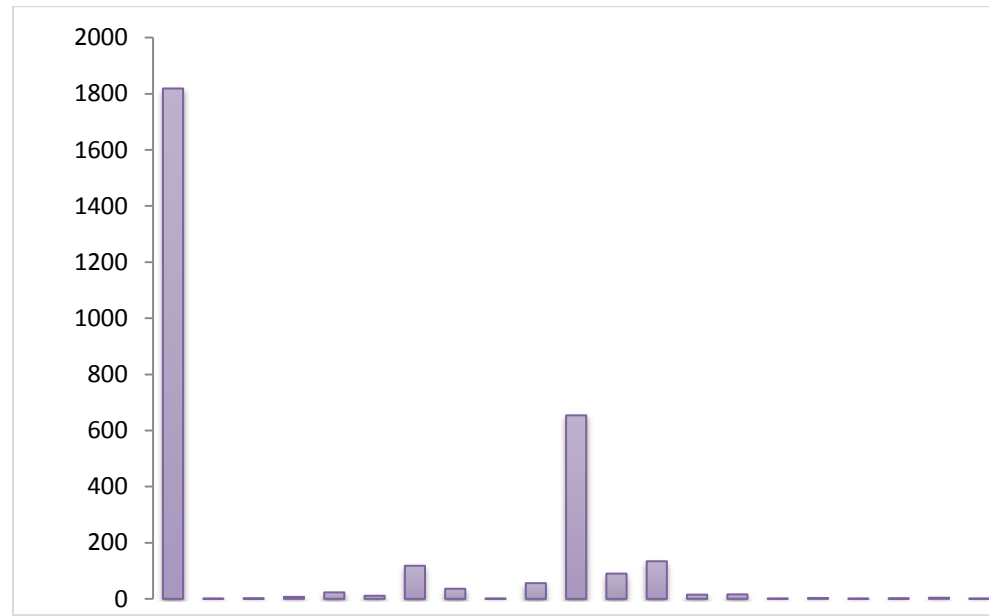
### **Graph 2. Region Wise Count**



**Source: As Calculated by Researcher (Data Not shown due to confidential concern)**

- Access/ Connectivity subcategory queries are mostly being asked so the concern team should focus upon giving access and connectivity to employees and has to be issued faster to stop getting regarding access/connectivity queries.

**Graph 3. Subcategory Wise Count**



**Source: As Calculated by Researcher (Data not shown due to confidential issues)**

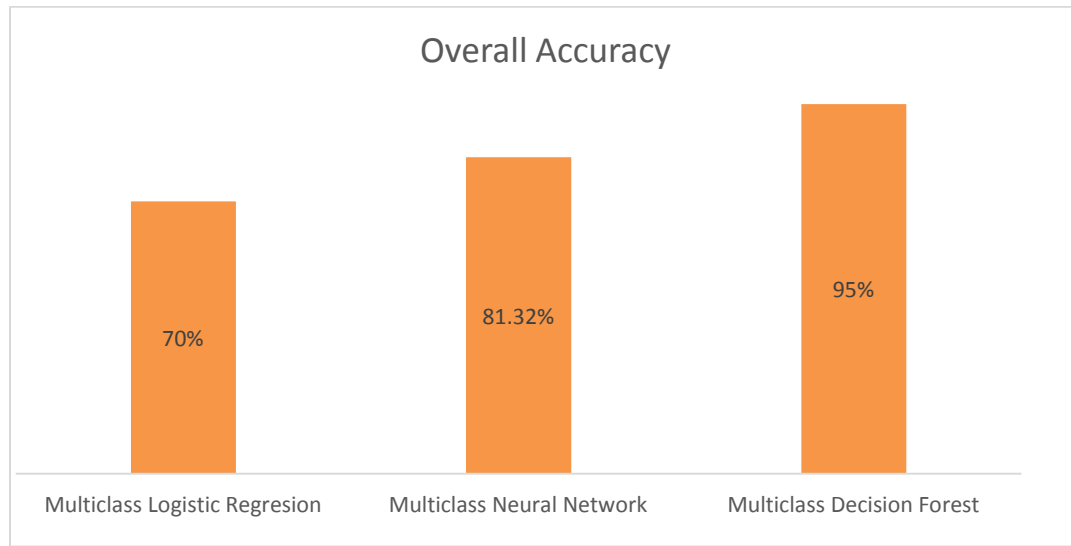
- Model works with the following parameters gives utmost precision in classified outputs as well as overall model accuracy:
  - Split Ratio- Between 75/25 to 80/20 works better
  - Model – Multi-Class Neural Network algorithm
  - Normalizer- Binning normalizer type
  - Learning rate- Between 0.7 to 0.9
  - Initial weights- Between 0.14 to 0.25
  - Number of hidden Nodes – 200 to 700
  - Momentum- 0
  - Number of iterations – 15 to 100
  - Not to uncheck remove duplicates in-text pre-processing
- Can use the model directly into service desk framework and can automate the ticket issuing and could make the process faster- thereby increasing the resolution speed by 40% to 50% and reducing the resolution time by 45% to 50% and could decrease in expenses incurred while hiring service desk employees involved in this process of issuing the ticket for the queries.

**Table No. 1. Results classification**

Algorithm	Overall Accuracy
Multi-Class Logistic Regression	70%
Multi-Class Neural Network	81.32%
Multi-Class Decision Forest	95%

**Source: As Calculated by Researcher**

**Graph 4. Overall Accuracy Algorithm Wise**



**Source: As Calculated by Researcher**

**References:**

1. Benites, F., & Sapozhnikova, E. (2017). Improving scalability of ART neural networks. *Neurocomputing*, 230, 219–229. <https://doi.org/10.1016/j.neucom.2016.12.022>
2. Brindha, S., Sukumaran, S., & Prabha, K. (2016). A survey on classification techniques for text mining. *Proceedings of the 3rd International Conference on Advanced Computing and Communication Systems*. IEEE. Coimbatore, India. <https://doi.org/10.1109/ICACCS.2016.7586371>
3. Cerri, R., Barros, R. C., & Carvalho, A. (2014). Hierarchical multi-label classification using local neural networks. *Journal of Computer and System Sciences*, 80, 39–56. <https://doi.org/10.1016/j.jcss.2013.03.007>esign. *Neurocomputing*, 222, 183–190. <https://doi.org/10.1016/j.neucom.2016.10.013>
4. Khan, A., Baharudin, B., Lee, L. H., & Khan, K. (2010). A review of machine learning algorithms for textdocuments classification. *Journal of Advances in Information Technology*, 1, 4-20.

5. Khan, A., Baharudin, B., Lee, L. H., & Khan, K. (2010). A review of machine learning algorithms for text documents classification. *Journal of Advances in Information Technology*, 1, 4-20.
6. Miner, L., D. Miner, G., & Jones, M. (2012). Scoring Retention and Success of Incoming College Freshmen Using Text Analytics. *Practical Text Mining and Statistical Analysis for Non-Structured Text Data Applications*, 605–643.doi:10.1016/b978-0-12-386979-1.00026-8
7. Nie, Q., Jin, L., Fei, S., & Ma, J. (2015). Neural network for multi-class classification by boosting composite stumps. *Neurocomputing*, 149, 949–956.  
<https://doi.org/10.1016/j.neucom.2014.07.039>
8. Ranjan, N. M., & Prasad, R. S. (2017). Automatic text classification using BPLion-neural network and semantic word processing. <https://doi.org/10.1080/13682199.2017.1376781>
9. Rubin, T. N., Chambers, A., Smyth, P., & Steyvers, M. (2012). Statistical topic models for multi-label document classification. *Machine Learning*, 88, 157–208.  
<https://doi.org/10.1007/s10994-011-5272-5>.
10. Srivastava, T. (2015). Difference between machine learning & statistical modeling. Retrieved on September 28 from  
<https://www.analyticsvidhya.com/blog/2015/07/difference-machine-learning-statistical-modeling/>
11. Stas, J., Juhar, J., & Hladek, D. (2014). Classification of heterogeneous text data for robust domain-specific language modeling. *EURASIP Journal on Audio, Speech, and Music Processing*, 14, 1-12.
12. Tang, X., & Xu, A. (2016). Multi-class classification using kernel density estimation on K-nearest neighbours. *Electronics Letters*, 52(8), 600–602.  
<https://doi.org/10.1049/el.2015.4437>
13. The Seven Practice Areas of Text Analytics. (2012). *Practical Text Mining and Statistical Analysis for Non-Structured Text Data Applications*, 29–41.doi:10.1016/b978-0-12-386979-1.00002-5
14. Tsai, C. F., & Chang, C. W. (2013). SVOIS: Support vector oriented instance selection for text classificatio Asadi, S., & Shahrabi, J. (2016). ACORI: A novel ACO algorithm for rule induction. *Knowledge-Based Systems*, 97, 174-187.  
<https://doi.org/10.1016/j.knosys.2016.01.005n>. *Information Systems*, 38, 1070–1083.  
<https://doi.org/10.1016/j.is.2013.05.001>.
15. Wang, J., & Park, E. (2017). Active learning for penalized logistic regression via sequential experimental d Liu, Y., Ni, X., Sun, J., & Chen, Z. (2011). Unsupervised transactional query classification based on webpage form understanding. *Proceedings of the 20th ACM*
16. International Conference on Information and Knowledge Management. Glasgow, Scotland, UK. <https://doi.org/10.1145/2063576.2063590>

17. Wu, J., Pan, S., Zhu, X., Cai, Z., Zhang, P., & Zhang, C. (2015). Self-adaptive attribute weighting for Naive Bayes classification. *Expert Systems with Applications*, 42, 1487–1502. <https://doi.org/10.1016/j.eswa.2014.09.019>
18. Yi, W., Lu, M., & Liu, Z. (2011). Multi-valued attribute and multi-labeled data decision tree algorithm. *International Journal of Machine Learning and Cybernetics*, 2(2), 67-74. <https://doi.org/10.1007/s13042-011-0015-2>
19. Zhoua, L., Pana, S., Wanga, J., Athanasios, V., & Vasilakos. (2017). Machine learning on big data: opportunities and challenge. *Neurocomputing*, 237, 350–361. <https://doi.org/10.1016/j.neucom.2017.01.026>
20. Manisha Gawade, Tejashree Mane, Dhanashree Ghone, Prasad Khade and NiharRanjan. Text Document Classification by using WordNet Ontology and Neural Network. *International Journal of Computer Applications* 182(33):33-36, December 2018.
21. Thangaraj M., Sivakami M. Text classification techniques: A literature review *Interdisciplinary Journal of Information, Knowledge, and Management*, Volume 13, 2018
22. Halilintar, R. (n.d.). Rafi-halilintar. Retrieved from [www.rafi-halilintar.me](http://www.rafi-halilintar.me): <https://www.rafi-halilintar.me/lipay/multi-class-text-classification.html>
23. John, V. (2016). Rapid-Rate: A Framework for Semi-supervised Real- time Sentiment Trend Detection in Unstructured Big Data. Waterloo, Ontario: David R. Cheriton School of Computer Science.
24. ThangarajM, S. M. (2018). Text Classification Techniques: A Literature Review. *Interdisciplinary Journal of Information, Knowledge and Management*. Retrieved from [www.questia.com](http://www.questia.com): <https://www.questia.com/library/journal/1G1-544712905/text-classification-techniques-aliterature-review>
25. Venkata, S. L. (2017, October). Azure ML. Retrieved from [www.gallery.azure.ai](http://www.gallery.azure.ai): <https://gallery.azure.ai/Experiment/Email-Classification-for-Automated-Support-Ticket-Generation-Step-1-of-2-Train-and-Evaluate-Models-3>

■



### **Evaluation of Management Quality of Indian Banks**

**Dr. A. K. Singh**

**Mr. Samir Dubey**

#### **Abstract:**

In the organizations all over the world, human resource was supposed to be the area where most cost cutting decisions were taken. Human resource was never taken so seriously until recent years. In the recent past human resource has changed to human capital and then improvised to intellectual capital. This all is the result of increasing contribution of service sector in the GDP of the countries all over the world more specifically in the developed countries and the newly developed nations. India is no exception to this change. There are studies all over the world which are proving human resources to be the most important resource which stood neglected till date. As of now as well research and innovations in the sector of human capital or intellectual capital are in infancy only. In our research, we have tried to evaluate management quality of Indian Banks. We have used ANOVA for the purpose. Inter-sector comparison has been done with the help of students' "t" statistic. We observed that there lies significant difference in the human resources of different sector of banks in the country.

## **1. Introduction**

In recent times human resources have emerged as the most important one in all factors of production. Reason seems behind this is increasing proportion of service sector in the world wide GDP of different countries. Once there was a time when human resources were supposed to be the cost centers for the organization, but now time has changed. There are countries in the world like Gibraltar with 100% of GDP from service sector. As per statistics from 2017 top 10 countries, in terms of GDP, namely USA, China, Japan, Germany, France, UK, India, Brazil, Italy and Canada all have more than 50% of their GDP coming from service sector only. With the change in time, knowledge and communication with customers, have gained a lot of importance. The ones who are establishing and strengthening this communication and sharing knowledge with them must gain advantage. These human resources are thus considered as assets and a source of competitive advantage in the service sector.

As human resources are most complicated in knowledge based economy it is more difficult to assess and control the same. Most managers make strategies which are based on other factors of production viz. technology and financial resources. In the changing era, it is not advisable to ignore human resources. These are humans only who shall be optimizing the usage of financial resources and technical resources. We can say that now technology and finance are not in a position to provide competitive

advantage to the organization rather human resources do. Thus organizations need to concentrate more on strategies related to human resources in case they are looking forward for longer survival.

## **2. Literature Review**

Banking, being one of the major contributors towards service sector cannot remain aloof from this. Following are the studies where human factor has been analyzed and discussed in different aspects.

Firer, S. and Mitchell Williams, S. (2003) investigated the relation between the efficiency of value added (VA) and three traditional dimensions of overall firms' performance namely profitability, productivity, and market valuation. Findings reflected that associations between firm's major resource bases and profitability, productivity and market valuation were limited and mixed. The overall findings suggest that physical capital still remains the most significant resource for corporate performance as compared to human resources.

Mavridis, D. (2004) analyzed the human capital and physical capital of the banks in Japan. He also discussed impact of Human capital and Physical Capital on the banks' value- based performance. He focused on the actual status of human resources and physical capital. The study not only confirmed existence of significant differences among the various groups of Japanese banks. The study also confirmed differences between Japanese and European banks.

Malina Hanum, Mohd Kamal, Rosfatihah Che Mat, Najihah Abdul Rahim, Norhusniyati Husin and Irwan Ismail (2006) determined the relationship between the level of efficiency of human resources in terms of Human Capital, Capital Employed and Structural Capital and performance of commercial banks in Malaysia. Overall results revealed positive relationship between intellectual capital and performance of banks. The results also showed significance impact of human resource variables on bank performance. It is suggested that human resources do matters and they should also be linked to firm productivity.

Maria do Rosário Cabrita, Nick Bontis (2008) examined the Portuguese banking industry for finding inter-relationships and interactions among HR components and business performance. The study is characterized with extension of the concept of relational capital to include 'stakeholder orientation'. Results show a confirmation of previous studies regarding performance of organizations and efficiency of human resources.

Joshi, M., Cahill, D. and Sidhu, J. (2010) examined Australian banks for the period 2005 to 2007 for performance of human resources. They also examined the relationship amongst various constituents of performance of human resources. The paper revealed all Australian owned banks have higher human capital efficiency as compared to capital employed efficiency and structural capital efficiency. The size of the bank has little or no impact on the performance of

human resources of Australian owned banks. Size of the bank here was estimated with the help of total assets, total number of employees and total shareholders' equity. Maditinos, D., Chatzoudes, D., Tsairidis, C. and Theriou, G. (2011) observed that human resources show a significant growing acceptance in practical implication. The study concluded that there is a significant relationship between human capital and financial performance. Despite the fact that human resource is increasingly recognized as strategic asset for sustainable development and corporate competitive advantage, the results proved that, in the Greek business context, human resources development seems to be one of the most significant factors of economic success. Therefore we can say that a focus on human capital should be at the apex of companies' attention.

Samuel Kai Wah Chu, Kin Hang Chan, Ka Yin Yu, Hing Tai Ng and Wai Kwan Wong (2011) examined the performance of human resources of companies in Hong Kong and its association with business performance. Four accounting ratios namely Market-to-Book value (MB), Return on Assets (ROA), Asset Turnover (ATO) and Return on Equity (ROE) were selected as the indicators of financial performance. Components of human resources were found to predict a substantial variance in financial performance of the sample firms. The findings indicated a gap between the traditional accounting concept and the value creation concept. This value creation concept is new to human resources accounting. While their findings

indicated the importance of human resources for the companies, physical and financial assets may still be considered as the key resources in achieving success.

Mondal, A. and Ghosh, S. (2012) tested the relationship between human resources and financial performance of Indian banks for a period of ten years from 1999 to 2008. The analysis indicated that the relationships between the performance of a bank's human resources, and profitability and productivity, were mixed. The study results suggest that banks' human resources are vital for their competitive advantage.

Saeed Fathi, Shekoofeh Farahmand and Mahnaz Khorasani (2013) examined the relationship between human resources and financial performance. Results revealed that there exists significant positive relationship between performance of human resources and efficiency of structural capital component. Structural capital efficiency was determined by three financial performance measures namely, Return-on-Equity, Return on Assets and Growth Revenue. Results indicated that there exist significant positive relationship between efficiency of capital employed and efficiency of human resources. There is no significant relationship between efficiency of capital employed and efficiency of human capital with growth revenue (GR). Results proved that the organizations can achieve sustainable development with investment on human resources.

S. Mitchell Williams (2014) addressed various lacking in the corporate governance and human resource literature by examining

the boards of directors of South African publicly listed firms. He also examined the degree of performance of their human resources. Results indicated a positive relationship between the percentage of female directors on the boards of directors and a firm's human resource performance. It may be concluded that the firms may be able to enhance their HR performance by utilizing a well-balanced and structured board of directors in terms of gender. Results of this study supported the application of resource dependence theory as a relevant theoretical framework for intellectual capital performance.

Alhassan, A. and Asare, N. (2016) examined the effect of efficiency of human resources on bank productivity in Africa. They found that productivity is largely driven by efficiency changes as compared to technological changes. The results indicated that Value Added Intellectual Coefficient had a positive effect on the productivity of banks in Ghana. Findings supported incremental investments in human resources as a means of improving the performance of banks in emerging markets.

Nasif Ozkan Sinan Cakan\_Murad Kayacan (2017) analyzed banks operating in Turkey for relationship between the performance of human resources and financial performance. The performance of human resources and was measured through the value added intellectual coefficient (VAIC) methodology. The performance of human resources of the Turkish banking sector is generally affected by the efficiency of human capital. It was observed that

efficiency of capital employed and efficiency of human capital positively affect the financial performance of banks. However, the efficiency of capital employed has more influence on the financial performance of banks rather than efficiency of human resources. Thus the banks operating in Turkey are suggested for more efficient utilization of their financial and physical capitals if they wish to reach a higher profitability level.

Tiwari, R. and Vidyarthi, H. (2018) explored the linkage between human resources and performance of banks. Results of the study provided evidence of positive association between efficiency of human resources and performance of banks. Only human capital and structural capital have shown positive linkage with performance of banks. The results also indicated that the human resources of private sector banks perform better than public sector banks in India. This study motivated Indian banks to measure efficiency of their human resources and to develop policies to promote and improve human resources to enhance their performance.

### **3. Objective and Hypothesis**

#### ***Objective***

Whether, human resources in Indian Banks are performing identically or not.

#### ***Hypothesis***

H1: There is no significant difference in the Management Quality of Indian banks

H2: There is no significant difference in Management Quality of SBI & Associates and Nationalized Banks

H3: There is no significant difference in Management Quality of Nationalized Banks and Private Banks

H4: There is no significant difference in Management Quality of SBI & Associates and Private Banks

### **4. Data and Methodology**

#### ***Data and Collection***

For the purpose of our study we have divided the Indian banking industry in 3 different sectors namely SBI and Associates, Nationalized banks and Private Banks. 3 SBI & Associate Banks, 10 each of Nationalized and Private Banks have been selected.

Data regarding Management Quality (Business per Employee and Profit per Employee) of the banks have been collected from the annual reports of banks.

#### ***Methodology***

Statistical Average has been used for comparing the over all sectors with one another.

Students “t” statistic has been used for comparing the sectors. SBI Associates have been compared with Nationalized and Private Banks.

ANOVA (“F” test) has been used for drawing results for over all banking industry.

## 5. Data Analysis, Results and Interpretation

H1 There is no significant difference in the Management Quality of Indian banks

### Test for evaluation: ANOVA

Descriptive								
Management Quality								
	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min	Max
					Lower Bound	Upper Bound		
SBI & Ass	10	338.6240	107.84074	34.10224	261.4794	415.7686	226.20	570.27
Nationalized	10	743.9990	417.42549	132.00153	445.3908	1042.6072	248.77	1400.96
Private	10	717.4740	136.31117	43.10538	619.9629	814.9851	553.01	947.85
Total	30	600.0323	314.51233	57.42183	482.5915	717.4732	226.20	1400.96
<i>Calculated by researcher.</i>								

Test of Homogeneity of Variances			
Management Quality			
Levene Statistic	df1	df2	Sig.
13.282	2	27	.000

ANOVA					
Management Quality					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1028532.629	2	514266.315	7.546	.002
Within Groups	1840089.584	27	68151.466		
Total	2868622.213	29			
<i>Calculated by researcher.</i>					

Robust Tests of Equality of Means				
Management Quality				
	Statistic <sup>a</sup>	df1	df2	Sig.
Welch	24.595	2	16.136	.000
Brown-Forsythe	7.546	2	12.198	.007
a. Asymptotically F distributed.				

Financial Institutions basically belong to the service industry. Service industry depends a lot on the individuals forming human resources. Sound management is one of the most important factors behind performance of financial institutions. Better performance is best reflected and judged in the form of business generated every year and the profit ploughed out. Business per employee and Profit per employee have been taken as the performance indicators for the banks. Both Business per Employee and Profit per Employee were subjected to ANOVA for any difference or change during the periods of study. The result of the test is  $p = 0.002$ . As  $p$  is less than the table value 0.05 we don't find any reason to accept the null hypothesis "There is no significant difference in the Management Quality of Indian Banks".

H2 There is no significant difference in Management Quality of SBI & Associates and Nationalized Banks

### T-Test

Group Statistics				
Bank	N	Mean	Std. Deviation	Std. Error Mean
SBI & Ass	10	338.6240	107.84074	34.10224
Nationalized	10	743.9990	417.42549	132.00153
<i>Calculated by researcher.</i>				

Independent Samples Test									
	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2- tailed)	Mean Diff	Std. Error Diff	Lower	Upper
Equal variances assumed	16.384	0.001	-2.973	18	0.008	-405.37	136.33	-691.80	-118.94
Equal variances not assumed			-2.973	10.196	0.014	-405.37	136.33	-708.35	-102.39
Calculated by researcher.									

The test for equality of variances (Levene's Test) is lesser than 0.05,  $p = 0.001$ , which reflects a significant difference in the variances of the population. Observations for the  $t$  value and the  $p$  value for 2 tailed test show that  $t = 2.973$  and,  $p = 0.008$ . This confirms that significant difference exists between the management quality of SBI & Associate Banks and Nationalized Banks. Thus we do not find any ground to accept the hypothesis "There is no significant difference in the Management Quality of SBI & Associate Banks and Nationalized banks".

H3 There is no significant difference in Management Quality of Nationalized Banks and Private Banks

#### T-Test

Group Statistics				
Bank	N	Mean	Std. Deviation	Std. Error Mean
Nationalized	10	743.9990	417.42549	132.00153
Private	10	717.4740	136.31117	43.10538
<i>Calculated by researcher.</i>				

Independent Samples Test									
	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2- tailed)	Mean Diff.	Std. Error Diff	Lower	Upper
Equal variances assumed	12.860	0.002	0.191	18	0.851	26.52	138.86	-265.21	318.26
Equal variances not assumed			0.191	10.898	0.852	26.52	138.86	-279.45	332.50
Calculated by researcher.									

The value of the test for equality of variances (Levene's Test) is lesser than 0.05,  $p = 0.002$ . This depicts that the population variances are not relatively equal. However, the  $t$  value (0.191) and the  $p$  value (0.851) are greater than 0.05. Since two out of three indicators are showing similar results we can say that there is no significant difference between the Management Quality of Nationalized Banks and Private Banks. Thus our hypothesis "There is no significant difference in the Management Quality of Nationalized Banks and Private Banks" stands accepted.

H4 There is no significant difference in Management Quality of SBI & Associates and Private Banks

#### T-Test

Group Statistics				
Bank	N	Mean	Std. Deviation	Std. Error Mean
SBI & Ass	10	338.6240	107.84074	34.10224
Private	10	717.4740	136.31117	43.10538
<i>Calculated by researcher.</i>				



Independent Samples Test									
	Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference
	F	Sig.	t	df	Sig. (2- tailed)	Mean Diff	Std. Error Diff	Lower	Upper
Equal variances Assumed	0.809	0.380	-6.893	18	0.000	-378.85	54.96	-494.32	-263.37
Equal variances not assumed			-6.893	17.095	0.000	-378.85	54.96	-494.76	-262.93
Calculated by researcher.									

The Levene' s Test in the comparison of Management Quality of SBI & Associate Banks and Private Banks shows  $p = 0.380$  which is more than 0.05. We can assume that the population variances are comparatively unequal. The  $t$  value and the  $p$  value for 2 tailed tests are found to be 6.893 and 0.000. This confirms that our hypothesis "There is no significant difference in the Management Quality of SBI & Associate Banks and Private Banks" cannot be accepted.

## 6. Conclusion

We can summarize the above observations as follows:

No.	Hypothesis	Test	Value
H1	There is no significant difference in the Management Quality of Indian Banks	F	0.002 Rejected
H2	There is no significant difference in the Management Quality of SBI & Associates and Nationalized Banks	t	2.973 Rejected
H3	There is no significant difference in the Management Quality of Nationalized Banks and Private Banks	t	0.191 Accepted
H4	There is no significant difference in the Management Quality of SBI & Associates and Private Banks	t	6.893 Rejected

Thus we can say that there is significant difference in the Management Quality of Indian Banks. In peer to peer comparison we can see that management quality of Nationalized Banks and Private Banks found similar while the Management Quality of SBI & Associates is different from two other sectors. This may be because of the recruitment procedure of the bank. Still it is suggested to be very precautions while selection and grooming of human resources as the literature indicates positive relationship between human resources and bank performance.

## **References**

1. Hendricks, L. (2002). How important is human capital for development? Evidence from immigrant earnings. *American Economic Review*, 92(1), 198–219.
2. <https://www.managementstudyguide.com/hrd-function-in-manufacturing-and-services-sectors.htm> retrieved on 09/12/2019.
3. Maditinos, D. Chatzoudes, D. Tsairidis, C. and Theriou, G. (2011), "The impact of intellectual capital on firms' market value and financial performance", *Journal of Intellectual Capital*, Vol. 12 No. 1, pp. 132-151. <https://doi.org/10.1108/14691931111097944>
4. Hang Chan, K. (2009), "Impact of intellectual capital on organizational performance: An empirical study of companies in the Hang Seng Index (Part 1)", *The Learning Organization*, Vol. 16 No. 1, pp. 4-21.
5. Samuel Kai Wah Chu, Kin Hang Chan, Ka Yin Yu, Hing Tai Ng and Wai Kwan Wong (2011) An Empirical Study of the Impact of Intellectual Capital on Business Performance. *Journal of Information & Knowledge Management* Vol. 10, No.01,11-21. <https://doi.org/10.1142/S0219649211002791>
6. Firer, S. and Mitchell Williams, S. (2003), "Intellectual capital and traditional measures of corporate performance", *Journal of Intellectual Capital*, Vol. 4 No. 3, pp. 348-360. <https://doi.org/10.1108/14691930310487806>
7. Mondal, A. and Ghosh, S. (2012), "Intellectual capital and financial performance of Indian banks", *Journal of Intellectual Capital*, Vol. 13 No. 4, pp. 515-530. <https://doi.org/10.1108/14691931211276115>
8. Nasif Ozkan Sinan Cakan Murad Kayacan(2017). Intellectual capital and financial performance: A study of the Turkish Banking Sector. *Borsa Istanbul Review*. Volume 17, Issue 3, September 2017, Pages 190-198. <https://doi.org/10.1016/j.bir.2016.03.001>
9. Mavridis, D.(2004), "The intellectual capital performance of the Japanese banking sector", *Journal of Intellectual Capital*, Vol. 5 No. 1, pp.92-115. <https://doi.org/10.1108/14691930410512941>
10. Alhassan, A. and Asare, N. (2016), "Intellectual capital and bank productivity in emerging markets: evidence from Ghana", *Management Decision*, Vol. 54 No. 3. <https://doi.org/10.1108/MD-01-2015-0025>
11. Joshi, M., Cahill, D. and Sidhu, J. (2010), "Intellectual capital performance in the banking sector:

- An assessment of Australian owned banks", *Journal of Human Resource Costing & Accounting*, Vol. 14 No. 2, pp. 151-170.
12. Tiwari, R. and Vidyarthi, H. (2018), "Intellectual capital and corporate performance: a case of Indian banks", *Journal of Accounting in Emerging Economies*, Vol. 8 No. 1, pp. 84-105.  
<https://doi.org/10.1108/JAEE-07-2016-0067>
  13. S. Mitchell Williams (2014) Corporate Governance Diversity and Its Impact on Intellectual Capital Performance in an Emerging Economy.
  14. <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.198.5168&rep=rep1&type=pdf> retrieved on 10/12/2019
  15. Malina Hanum Mohd Kamal, Rosfatihah Che Mat, Najihah Abdul Rahim, NorhusniyatiHusin and Irwan Ismail. Intellectual Capital And Firm Performance Of Commercial Banks In Malaysia. *Asian Economic and Financial Review* 2(4):577-590. :  
<http://aessweb.com/journal-detail.php?id=5002>
  16. Maria doRosárioCabrita, Nick Bontis (2008). Intellectual capital and business performance in the Portuguese banking industry, *International Journal of Technology Management*, Vol. 43, Nos. 1-3.
  17. SaeedFathi, ShekoofehFarahmand and MahnazKhorasani (2013). Impact of Intellectual Capital on Financial Performance. *International Journal of Academic Research in Economics and Management Sciences* January 2013, Vol. 2, No. 1 ISSN: 2226-3624.

■

### **Study on the Application of TOPSIS Method to Rank the Best Alternatives of Compact Sedan Cars in India**

**Mr. Arnav Chowdhury**  
**Dr. Ajay Malpani**

#### **Abstract:**

Indian automobile market is growing rapidly on day-to-day basis, and there is a huge demand of Compact Sedan Segment Cars among the potential customers. There are a few options on this segment and there is a great confusion among the buyers too. This research paper will focus on four major options in this segment and rank them according to the properties of the vehicle by using TOPSIS method.

**Keywords:** Best Cars, Compact Sedan, TOPSIS method, Cars in India, cars.

#### **Introduction:**

Sedans, or saloons, are a popular class of cars among Indian buyers. Carrying a three-box design language with four doors and a trunk, sedan cars offer luxury, performance and comfort all in one.

In the last two to three years, the Indian auto segment has seen the introduction of a good number of sedans classified into sub-categories. From sub-compact sedans to super-luxury, high-end models, there are sedans for every class of buyer. A feature

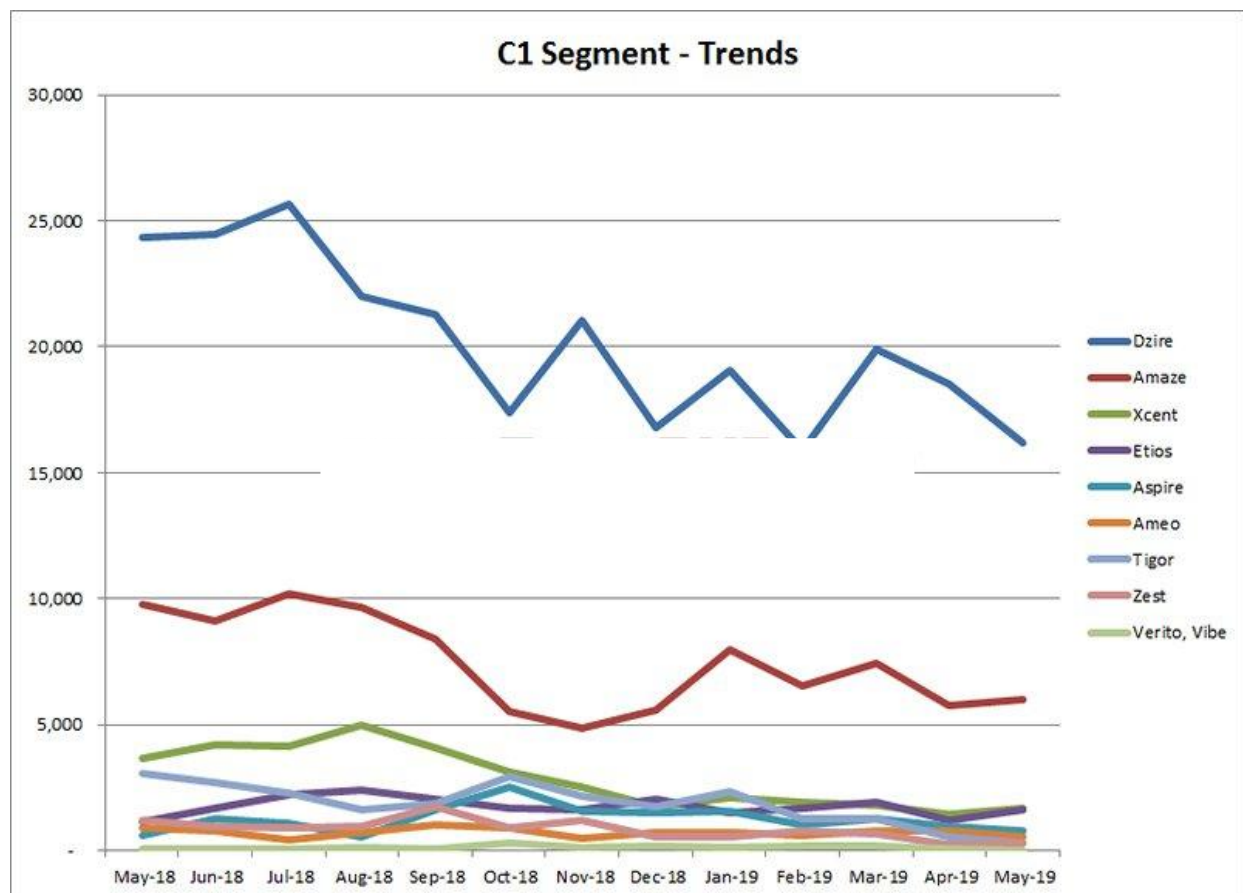
rich sedan car in India costs around can begin from Rs.5 lakhs. Sedan cars in India also include premium segment cars, which retail at very high prices and all kinds of Rs.10 crore marks.

Recall the time when the Indian government offered a lower tax on cars that measured 4 meters in length and were shorter than the engine's prescribed limits (1.2 liters for petrol and 1.5-liter for diesel).

High volume cars are the main drivers of segments due to increase in disposable income and availability of easy finance in both rural and urban areas. There is more competition in this field, with many new players coming in and global brands

entering the Indian market. The Indian automobile industry has incredible market potential. With the increase of population due to urbanization and their change in Indian automobiles has increased rapidly.

As per recent study on Indian Market, the market share of Sedan Sector is 16% of the total market and the trends shows that it will grow up in near future. This leads us with a thought to compare the cars especially in this sector so that buyers and sellers can benefitted by the results and make it easy for them to choose the best car of this segment. The following chart shows the past trends of the sales of the cars of this segment from May 18' to May 19'.



**Source: team-bhp.com**

### **Need for the Study**

In the wake of globalization, there has been all-round development in India, reflecting the increasing market share of automobile companies. World famous and global brands of automobiles have entered the Indian market. There is a tremendous demand for sports utility vehicles with increasing income levels and lifestyles. Data and information about the tastes and preferences of the buyer, brand preference and choices will go a long way in helping automobile industry formulate its strategy. Therefore, there is a mandatory requirement to compare specifications and other properties of compact sedan vehicles.

### **Literature Review**

**Manish Kumar Srivastava, A.K. Tiwari (2014)**, studied buyer behavior for Vehicles like Honda City and SX4 in a particular area. Customer purchase parameters Considerations for study are price, safety, comfort, power and pick, mileage, maximum speed, styling. After-sales service, brand name and spare parts cost. Based on the above parameters and analysis in it, he told that customers give a lot of importance when buying A3 segment cars. To soften, brand name, seating, and driving comfort. Word of mouth publicity and Car magazines are more effective communication mediums for promotion of cars.

**Prasanna (2013)**, Studies conducted to assess factors influencing buyer brand preference for SUVs and MUVs, product reliability, monetary factors, trendy appeal, and frequency of non-price promotions, trustworthiness, and brand association were recognized as prominent factors.

**Prof. Pallawi B. Sangode (2011)**, this work is based on comparative results Investigation of

service quality by Maruti Suzuki and Hyundai showrooms in Nagpur. Service quality is a fundamental aspect of service provision, and this is particularly the case with motor vehicles, in the maintenance of vehicles considerable profits achieved.

**K. Vidyavathi (2013)**, in her study, she sheds light on various aspects that manufacturers should concentrate on attracting potential buyers. The demand for the small automotive segment is rising due to the growing number of nuclear families and parking problems. Therefore, the manufacturers should find out the needs, desires, tastes and preferences of the buyers to design the products. In addition, fuel consumption and ride comfort are the most important parameters, followed by the availability of spare parts and their price.

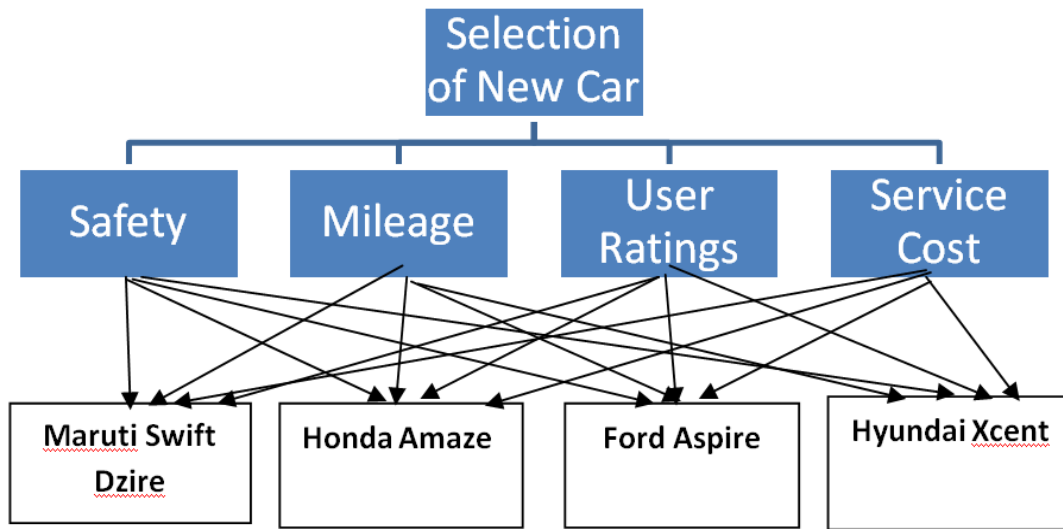
**Srikrishna, Sreenivasulu Reddy, Vani S, (2014)**, It is observed from the results that MARUTI ERTIGA, SWIFT, TATA INDICA and ALTO800 gained relative proximity. The values for and for the ideal solution are 0.45, 0.41, 0.74 and 0.17, respectively. It can be seen that the Indica is identified as the best car, which is considered the best relative value.

### **Methodology**

The aim of this work is to develop the TOPSIS method for vehicle selection. To start with collecting quantitative and to ensure a successful implementation, qualitative data was generated for the TOPSIS vehicle selection model, which could be applied in seven steps.

### **Criteria for Car Selection**

For this study, we have selected cars having similar costs. Some of the main criteria's of four wheelers are fuel economy, quality, life span, style, engine power four wheelers, engine limits, and dimensions of the car and cost of the car.



**Fig 1.1: Selection Criteria using TOPSIS**

TOPSIS methodology involves the following steps:

**Input Tables:**

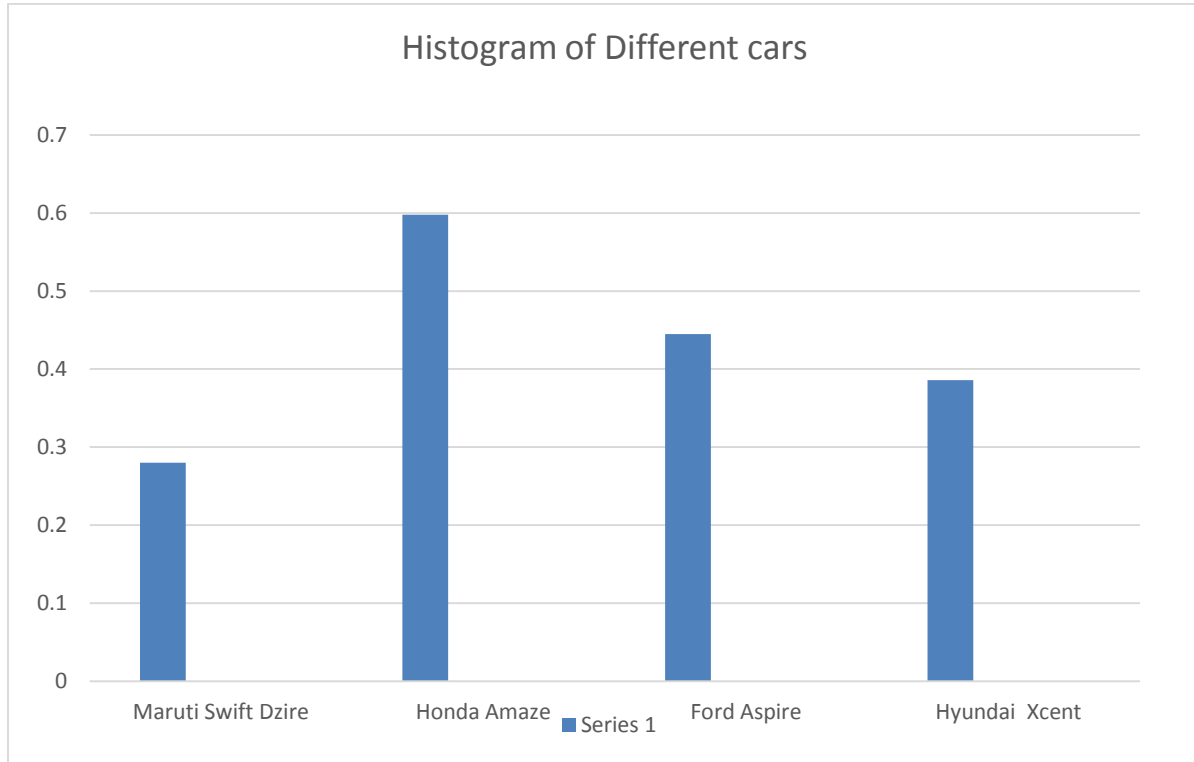
Attributes	Alternatives			
	Maruti Swift Dzire(C1)	Honda Amaze(C2)	Ford Aspire(C3)	Hyundai Xcent(C4)
Mileage (in KMPL) (L1)	22	19	20	20
Safety (out of 5)(L2)	2	4	3	2
User Ratings (Out of 5)(L3)	4.5	4.3	4.6	4.5
Service Cost (in INR Per Year) (L4)	4731/-	5458/-	4859/-	3449/-

Source: Data has been collected from cardekho.com and team-bhp.com

**Normalized Weighted Decision Matrix is**

<u>Cars</u>	<u>C1</u>	<u>C2</u>	<u>C3</u>	<u>C4</u>
<u>Attributes</u>	<u>Dzire</u>	<u>Amaze</u>	<u>Aspire</u>	<u>Xcent</u>
<u>Mileage L1</u>	<u>0.135</u>	<u>0.087</u>	<u>0.125</u>	<u>0.118</u>
<u>Safety L2</u>	<u>0.117</u>	<u>0.174</u>	<u>0.120</u>	<u>0.148</u>
<u>User Ratings L3</u>	<u>0.123</u>	<u>0.130</u>	<u>0.128</u>	<u>0.132</u>
<u>Service Cost L4</u>	<u>0.123</u>	<u>0.087</u>	<u>0.125</u>	<u>0.093</u>

<b>Best Answer Vector is</b>	{0.135, 0.174, 0.128, 0.093}
<b>Worst Answer Vector is</b>	{0.117, 0.087, 0.120, 0.148}
<b>Choices Distance from Best Vector is</b>	{0.090, 0.058, 0.059, 0.087}
<b>Choices Distance from Worst Vector is</b>	{0.035, 0.087, 0.047, 0.055}
<b>Closeness Vector of Each Choices</b>	{0.280, 0.598, 0.445, 0.386}



## Conclusion

The proposed procedure for compact sedan class four wheeler selections is to find the best car among available ones in market using of decision-making method. After checking the aggregations on numerous method parameters underneath completely different circumstances, it is observed that the proposed model is rather simple to use and meaningful for aggregation of the process parameters. TOPSIS is applied to attain final ranking preferences in falling order; therefore permitting relative performances to be compared.

From the results it is observed that HONDA AMAZE, FORD ASPIRE, HYUNDAI EXCENT and MARUTI SWIFT DZIRE obtained the relative closeness to ideal solution and the values are **0.598, 0.445, 0.386** and **0.280** respectively.

It is observed HONDA AMAZE is identified as the best car among the considered ones which has the best relative closeness value



## References

- Manish Kumar Srivastava, AK Tiwari, “A Study of Behavior of Maruti SX4 and Honda City Customers in Jaipur”, Pacific Business Review-Quarterly Referred Journal, 2014.
- M.Prasanna Mohan Raj, Jishnu Sasikumar, S.Sriram , A Study of Customers Brand Preference in SUVs and MUVS: Effect on Marketing Mix Variables, International Referred Research Journal Vol.- IV, Issue-1, pp. 48-58, Jan 2013.
- Prof. Pallawi B. Sangode, —Service Quality of Maruti Suzuki and Hyundai Dealer in Nagpur: A Comparative Study, International Journal of Research in Finance Marketing, Volume 1, Issue 1, May 2011, pp.41-45.
- K.Vidyavathi, Customer Life Style Influence of Consumer Behavior with Reference to Automobile

Industry in Chennai, Zenith International Journal of Multi disciplinary Research Vol.2, Issue 4, pp. 37-50, Apr 2012.

- Srikrishna , Sreenivasulu Reddy , Vani S, A New Car Selection in the Market using TOPSIS Technique, International Journal of Engineering Research and General Science Volume 2, Issue 4, June-July, 2014 ISSN 2091-2730.

## Webliography

- <https://yourstory.com/automotive/best-compact-sedans-in-india-2019>
- <https://autoportal.com/newcars/sedan-cars-in-india-cf/>
- <https://www.team-bhp.com/forum/indian-car-scene/210043-may-2019-indian-car-sales-figures-analysis.html>
- [www.cardekho.com](http://www.cardekho.com)

■

### **Emotional Commitment: A Drive to Work Engagement**

Dr Rajeshwari Gwal

Dr Anant Gwal

#### **Abstract:**

Work engagement of female employees is crucial and rewarding for the employers as she is instrumental in setting a positive happy working environment in the organizations. Levels of engagement does not significantly differ in males and females. The current study tried to study the impact of various Personality Dimension Extraversion, Agreeableness, Conscientiousness, Emotional Stability and Openness on work engagement levels of Married vis-à-vis Unmarried working women in Indore city.

Results indicate a moderate correlation between Personality and Work Engagement ( $r = .385, p < 0.05$ ). With Multiple Regression when various personality dimensions were predicted it was found that Extraversion (Beta = .251,  $p < .05$ ) and Agreeableness (Beta = .175,  $p < .05$ ) were significant predictors. Conscientiousness (Beta = .175,  $p < .05$ ) was a mild predictor, Emotional Stability (Beta = -.092,  $p < .05$ ) and Openness (Beta = -.165,  $p < .05$ ) were not a significant predictor.

**Implication of the study:** Moderately engaged employees can easily drift towards the negative end of the engagement scale resulting in negative outcomes. Organizations having global presence need to cater to this group of employees. Since linear regression explains 40.7% of the variance in the data personality does play a vital role in work engagement.

**Keywords:** Personality, Work engagement, Big Five Inventory, Utrecht Work Engagement Scale

## **Introduction**

### **Working women**

It does not matter ; what work she does, where she works, how she works ,how long she works; what matters is she works-today, tomorrow and the day after – making a difference in her life and to those around her.

Working women are the females in paid employment. Globalization and technological developments have catapulted them to venture into every field of science and technology; to learn, contribute, discover and invent.

## **Theoretical Framework**

### **Work Engagement**

Engaged individuals are mentally vigilant, apparently physically involved and emotionally connected with their work (Kahn ,1990).It involves a positive affective

motivational state of work related interests distinctively marked by vigour, dedication and absorption (Bakker, Schaufeli, Leiter & Taris, 2008). In today's globally competitive environment, employees need to be highly enthusiastic, energetic and mentally resilient while working and should put in all their efforts with determination even if they face hurdles (Bakker, Albrecht and Leiter, 2011).

### **Personality**

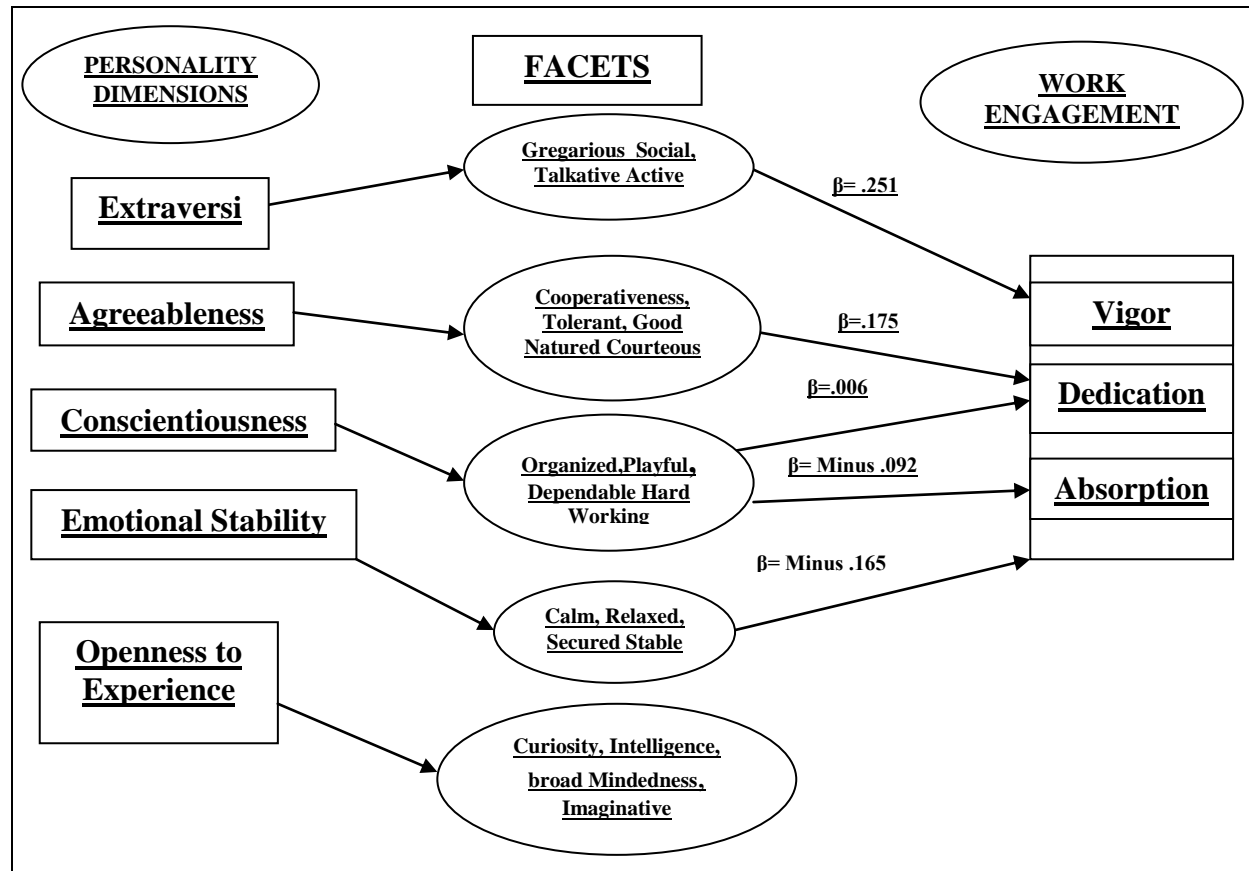
Personality of employees working in an organization is an important construct for work engagement. No two employees can have the same levels of work engagement. For a successful organization, there has to be a true match of job and employee skills. If there is a proper match; it is not only beneficial to employees but also to organizations in terms of positive outcomes like increased productivity, efficiency and growth.

Big Five model has personality measures classified as dimensions (Goldberg, 1990; Hogan et al., 1996) which are significantly related to various cultures (McCrae & Costa, 1997).These measures are inherited (Jang, Livesley & Vernon, 1996) having genetic base (Digman, 1989).These personality dimensions (Extraversion, Agreeableness, Conscientiousness, Emotional Stability and Openness to Experience ) are responsible for distinct personality(Goldberg, 1990; McCrae & Costa, 1997).

Extraversion implies an energetic approach and includes traits such as gregarious, social, talkative active. Agreeableness includes

traits such as cooperativeness, tolerant, good natured, courteous (John & Srivastava, 1999). Conscientiousness includes traits such as responsible, organized, playful, dependable and hard working. Emotional

stability includes calm, relaxed and secured traits. Openness to experience has traits of curiosity, intelligence, broad mindedness, imaginative (Goldberg, 1993)



Source: Author

Fig.1 Proposed Research Framework

## Research Methodology

The study was exploratory in nature. In this study, working women—both married and unmarried—from Indore city were selected for data collection. Non-probability sampling method was used. It was a purposive sampling where respondents were chosen in the age group 25-34 years, 35-44 years and above 45 years working in different sectors with minimum qualification being undergraduate

**Sample:** 300 working women which includes 150 married and 150 unmarried women.

## Tools for Data Collection

Two questionnaires were distributed among the subjects for data collection: **The Big Five Inventory (BFI)** and **Utrecht Work Engagement Scale (UWES)**.

## Tools for Data Analysis

Data was analyzed using SPSS 20. Hypothesis were tested using correlation and multiple regression.

## Objectives of Study

- 1) To study the nature of relationship of personality dimensions of Big Five Model on Work Engagement.
- 2) To identify the predictors of work engagement of working women in Indore city.

## Hypothesis:

$H_{01}$ : *There is no significant correlation between Personality and Work Engagement*

$H_{02}$ : *There is no supported relationship between Personality Dimensions and Work Engagement*

## Result and Discussion

**Table 1: Reliability Analysis of all variables**

Characteristics	Items	Cronbach alpha
<b>Big 5 Inventory</b>	BFI 44-item	0.698
Extraversion	BFI 1, 6R1, 11,16, 21R, 26, 31R, 36	0.739
Agreeableness	BFI 2R, 7, 12R, 17, 22, 27R, 32, 37R, 42	0.644
Conscientiousness	BFI3, 8R, 13, 18R, 23R, 28, 33, 38, 43R	0.725
Emotional Stability	BFI 4, 9R, 14, 19, 24R, 29, 34R, 39	0.752
Openness to Experience	BFI5, 10, 15, 20, 25, 30, 35R, 40, 41R, 44	0.739
<b>Work Engagement</b>	UWES 17-item	0.946
Vigor	UWES 1,4,8,12, 15,17	0.860
Dedication	UWES 2,5,7,10,13	0.885
Absorption	UWES 3,6,9,11,14,16	0.865

*Source: Author*

From Table 1; it is seen that the alpha coefficients for the **The Big Five Inventory** and **Utrecht Work Engagement Scales** are in line with the acceptable alpha coefficient cut off point of 0.70 (Nunnally & Bernstein, 1994).

**Table 2: Correlation between Personality and Work Engagement Correlation**

		Personality	Work Engagement
Personality	Pearson Correlation	1	.385
	Sig.(2-tailed)		.542
	N	300	300
Work Engagement	Pearson Correlation	.385	1
	Sig.(2-tailed)	.542	
	N	300	300

The result in Table 2 indicates that the correlation between Personality and Work Engagement of working women is .385. The p-value is .542 which is more than 0.05, the assumed level of significance. This implies that the correlation coefficient between Personality and Work Engagement is high and statistically significant. Hence there exists a moderate correlation between Personality and Work Engagement.

**Table 3: Regression results testing the relationship between Personality Dimensions and Work Engagement Model Summary<sup>b</sup>**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin - Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.638	.407	.398	8.19291	.577	2.598	6	294	.026	1.747

- Predictors: (Constant), Openness, Extraversion, Agreeableness, Emotional Stability, Conscientiousness
- Dependent Variable: Work Engagement score

Table 3 shows the multiple linear regression model summary and overall fit statistics. We find that the adjusted  $R^2$  of our model is .0398 and  $R^2 = .407$ . This means that the linear regression explains 40.7% of the variance in the data. The Durbin-Watson  $d = 1.747$  which is between the two critical values of  $1.5 < d < 2.5$ . Therefore, we can assume that there is no first order linear auto-correlation in our multiple linear regression data.

**Table 4 : ANOVA<sup>a</sup>**

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	602.640	6	120.528	2.598	.026 <sup>b</sup>
Residual	13640.440	294	46.396		
Total	14243.080	300			

- a. Dependent Variable: Work Engagement Score
- b. Predictors: (Constant), Openness, Extraversion, Agreeableness, Emotional Stability, Conscientiousness

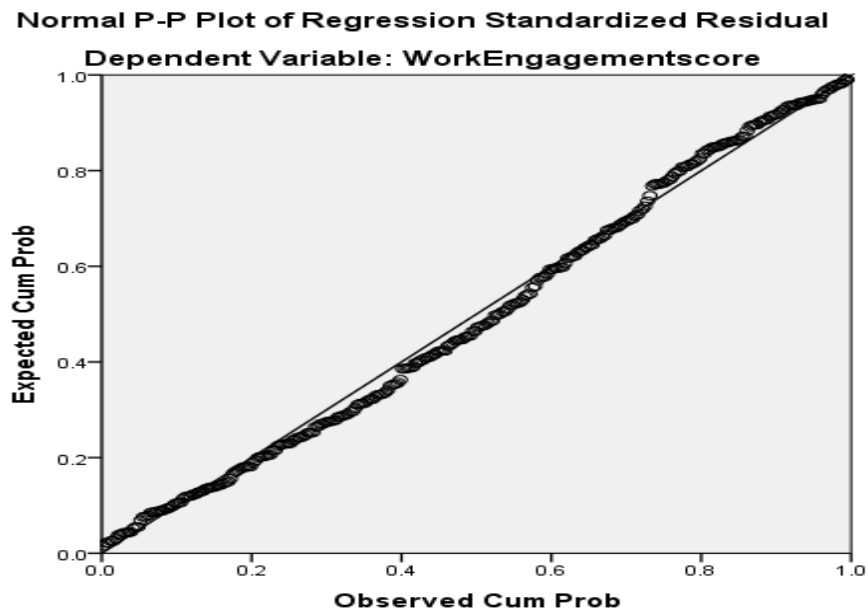
Table 4 tells us whether or not our model (which includes Extraversion, Agreeableness, Conscientiousness, Emotional Stability and Openness) is a significant predictor of the outcome variable. As the significance value (.026) is less than  $p=0.05$ , we can say that the regression model significantly predicts Work Engagement.

The results indicated that the model was a significant predictor of Work engagement,  $F(6,294) = 2.598$ ,  $p = .026$ .

Table 5 : Coefficients <sup>a</sup>							
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	43.605	4.779		9.125	.000	34.200	53.010
Extraversion	.251	.111	.133	2.266	.024	.033	.469
Agreeableness	.175	.106	.099	1.654	.019	-.033	.383
Conscientiousness	.006	.117	.003	.052	.048	-.224	.236
Emotional Stability	-.092	.108	-.053	-.855	.393	-.304	.120
Openness	-.165	.089	-.108	-1.848	.166	-.340	.011

*Source: Author*

**Table 6: Normal P – P Plot**



Lastly, we can check for normality of residuals with a normal P-P plot. The plot shows that the points generally follow the normal (diagonal) line with no strong deviations. This indicates that the residuals are normally distributed.

"When various personality dimensions were predicted it was found that Extraversion (Beta = .251,  $p < .05$ ) and Agreeableness (Beta = .175,  $p < .05$ ) were significant predictors. Conscientiousness (Beta = .175,  $p < .05$ ) was a mild predictor, Emotional Stability (Beta = -.092,  $p < .05$ ) and Openness (Beta = -.165,  $p < .05$ ) were not a significant predictor.

#### **Estimated Model Coefficient**

**The general form of equation is:**

$$\text{Predicted Work Engagement} = 43.605 + .251(\text{Extraversion}) + .175 (\text{Agreeableness}) + .006 (\text{Conscientiousness}) - .092 (\text{Emotional Stability}) - .165 (\text{Openness})$$

#### **Result:**

From the multiple linear regression model summary the adjusted  $R^2$  of our model is .0398 and  $R^2 = .407$  which explains 40.7% of the variance in the data.

From the Anova Table, as the significance value (.026) is less than  $p = 0.05$ , we can say that the regression model significantly predicts Work Engagement.

When various personality dimensions were predicted it was found that Extraversion (Beta = .251,  $p < .05$ ) and Agreeableness (Beta = .175,  $p < .05$ ) were significant predictors. Conscientiousness (Beta = .175,  $p < .05$ ) was a mild predictor, Emotional

Stability (Beta = -.092,  $p < .05$ ) and Openness (Beta = -.165,  $p < .05$ ) were not a significant predictor.

**The general form of equation is:**

$$\text{Predicted Work Engagement} = 43.605 + .251(\text{Extraversion}) + .175 (\text{Agreeableness}) + .006 (\text{Conscientiousness}) - .092 (\text{Emotional Stability}) - .165 (\text{Openness})$$

#### **Findings and Conclusion:**

The result reveals that Extraversion and Agreeableness are significant predictors whereas Conscientiousness was a mild predictor. There was no direct relationship between Emotional Stability and Openness with work engagement.

Work engagement was predicted by high scores for Extraversion. Extraversion is characterized positive feelings and experiences and is therefore seen as a positive affect (Clark & Watson, 1991). Working women with high levels of Extraversion will experience positive emotions and hence will be motivated indicating more propensities for engagement (Langelaan et al., 2006). Working women demonstrate Agreeableness (Barrick & Mount, 1991) by being pleasant, warm, likeable and tend to act in accordance with other people's interests (Graziano and Tobin, 2009).

Conscientious people are having the ability to get involved more striving for dedication and absorption both (Mostert and Rothmann, 2006). Conscientiousness indicates that individuals are goal orientated and more likely to achieve (Barrick et al., 1993).



Conscientiousness moderately predicts work engagement, the reason being a few may be more responsible at personal front.

### **Limitations of the study:**

Since purposive sampling was used, the respondents selected may not be fully representative of the general population. Also the respondents were picked up from variety of occupations. This limits occupational, organizational or sector specific effects that might have resulted in biasness in results. Longitudinal or time series data collection approach can add information in the relations between personality dimensions and work engagement.

### **Scope of the Study:**

Earlier researches have shown that Big Five personality dimensions are related to work engagement, especially Extraversion and Conscientiousness predict work engagement in various occupations (Schneider, 1999; Vinchur et al.,1998).These researches are being done in different context in different countries .In India; especially in Indore, psychometric tests are not used by all companies or for all types of vacancies. Hence the skills derived after selection may not be the representative for the task allocated and hence skill shortage may exist. Hence research regarding the impact of personality dimensions on work engagement is therefore necessary. An alternative approach to curb the growing costs of recruiting the right candidate is

Psychometric tests at the start of the selection process to assess the personality dimensions of the perspective candidates. These tests will efficiently weed out unsuitable candidates before they even enter the recruitment process, leaving a smaller, better qualified pool for possible recruitment. Personality tests results are only tool to help managers interpret employees fit with an organization's culture and required skills. These tests can be used to assess the personality dimensions which predict work engagement.

The present study has been done to study the predictors of work engagement in working women. A comparative study can be done between married and unmarried working women. It can be further done on a comparison between Working Men and Women. The impact of Personality can be studied on Work Engagement of various Demographic variables. The results of this study can be used by both public and private sector organizations facing problems related to employee engagement.

## **References**

1. Bakker, A. B., Albrecht, S. L., & Leiter, M. P. (2011). Key questions regarding work engagement. *European Journal of Work and Organizational Psychology*, 20, 4-28.
2. Bakker, A. B., Schaufeli, W. B., Leiter, M. P. & Taris, T. W. 2008. Work engagement: An emerging concept in occupational health psychology. *Work & Stress*, 22(3), 187-200.
3. Barrick, M. R., & Mount, M. K. (1991). The big five personality dimensions and job performance: A meta-analysis. *Personal Psychology*, 44(1), 1e26.
4. Barrick, M. R., Mount, M. K., and Strauss, J. P. (1993). Conscientiousness and performance of sales representatives - test of the mediating effects of goal-setting. *Journal of Applied Psychology*, 78, 715-722.
5. Digman JM (1989). Five robust trait dimensions: Development, stability, and utility. *J. Pers.* 57(1):195-214.
6. Goldberg, L. R. (1993). The structure of phenotypic personality traits. *American psychologist*, 48(1), 26.
7. Goldberg, L., (1990). An alternative "description of personality": The Big-Five factor structure. *Journal of Personality and Social Psychology*, 59, 1216-1229.
8. Graziano, W. G., and Tobin, R. M. (2009). Agreeableness. In M. R. Leary & R. H. Hoyle (Eds.), *Handbook of Individual Differences in Social Behavior*. New York: Guilford Press.
9. Hogan, R., Hogan, J. & Roberts, B.W. (1996). Personality measurement and employment decisions: Questions and Answers. *American Psychologist*, 51, 469-477.
10. Jang, K.L., Livesley, W.J. & Vernon, P.A. (1996). Heritability of the big five personality dimensions and their facets: A twin study. *Journal of Personality*, 64, 577-591.
11. John, O. P., & Srivastava, S. (1999). The Big Five trait taxonomy: History, measurement, and theoretical perspectives. In L. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research*. (pp. 102-138). New York: Guilford Press.
12. Kahn, W. A. 1990. Psychological conditions of personal engagement and disengagement at work. *Academy of Management Journal*, 33(4), 692-724.
13. Langelaan, S., Bakker, A. B., Van Doornen, L. J. & Schaufeli, W. B. 2006. Burnout and work engagement: Do individual differences make a difference?. *Personality and Individual Differences*, 40(3), 521-532.
14. McCrae, R. & Costa, P., (1997). Personality trait structure as a human universal. *American Psychologist*, 52, 509-516.
15. Mostert, K. & Rothmann, S. 2006. Work-related well-being in the South

- African Police Service. *Journal of Criminal Justice*, 34(5), 479-491.
16. Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory*. New York, NY: McGraw-Hill.
17. Schneider, M.H. (1999). The relationship of personality and job settings to job satisfaction. *Dissertation Abstracts International: Section B: Science and Engineering*, 59, 6103.
18. Vinchur, A.J., Schippmann, J.S., Switzer, F.S. & Roth, P.L. (1998). A meta-analytic review of predictors of job performance for salespeople. *Journal of Applied Psychology*, 83, 586-597.
19. Yildirim, I. (2008). Relationships between burnout, sources of social support and Socio demographic variables. *Social Behavior and Personality*, Vol. 36, pp 603-616.
-

### **A Study on the Role of Professional Education in Enhancing GRIT Among Students: with reference to Indore City.**

**Dr. Parul Sharda**

#### **Abstract:**

The Concept of GRIT was originally articulated by Duckworth et.al (2007), which explains that, it is not only the IQ which plays an important role in academic achievement, but it is the passion and perseverance which drives the students to be successful in all aspects of life GRIT is like running marathon of life, until gets successful. But the question is what role the educational institutes playing in improving GRIT among students?

According to Stanford University, Growth mindset is required to be built for improving grit, and for that, the professional system should focus on helping and mentoring the students in defining their goal, make them learn the strategies to enhance focus upto 100%, nurture them to develop the listening skills to get the real insights about what they have done i.e getting feedback, and last but not the least is bounce back with corrected version of yourself. Through this study the researcher has tried to find the association between academic activities and grit. Regression is applied to understand the

relationship of professional education and GRIT. The findings and implications of this study will be useful for professional institutes, academicians and researchers to better understand their role in improving growth mindset among students.

**Keywords:** GRIT, Growth Mindset, Professional Institutes, Growth, Resilience, Integrity, Tenacity

### Introduction:

Previous research studies on Psychology stresses on intelligence, which has looked at both theoretical and applied aspects of the concept. Clinical psychologists have relied on various iterations of the intelligence scales originally developed by Wechsler (1955). The various concepts such as Perseverance, Growth Mindsets And Goal Driven Behaviours which are identified to be non-cognitive traits were studied earlier in the field of education (Londoner, 1972; Levy and Dweck, 1998) the field of education (Londoner, 1972; Levy and Dweck, 1998) Which focuses on the importance of these non cognitive traits in this field was populated by Dr. Angela Lee Duckworth, Who gets the credit for developing the concept of grit. This can be divided into two sub-components; perseverance of effort and consistency of interest and the importance of fostering grit to enhance personal achievement and success. Angela Duckworth (2007) in her words defines grit as the “perseverance and passion for long-term goals” and states that it involves “*working strenuously towards challenged, maintaining effort and interest*

*over years despite failure, adversity, and plateaus in progress.*” Also, Duckworth identified the strong role of stamina in grit and thereby stresses the stamina in grit, and describes a “gritty” individual as somebody who treats and finds their success and achievement as a marathon, rather than a sprint. Prior to Duckworth developing her research into non-cognitive predictors of academic success, educational research had focused on the more traditional measures of academic outcomes and a less focus into non-cognitive traits. Thus, the research of Duckworth has generated a positive shift in research and focus into predominantly considering non-cognitive traits, such as grit, that showed an individual’s character was much more influential than IQ.

### 1.1 Model of GRIT

**Fig: 1 Cyclical flow to achieve GRIT**



**Source: Self-Developed by Researched**

## **2. Literature Review**

Christopoulou et al., (2018) in their findings demonstrated “that GRIT shows weak to moderate correlations with educational variables. Its two dimensions play different roles, while perseverance being a stronger positive predictor of academic performance. Finally, positive variables, such as hope, positive affect and family relationships can foster GRIT. GRIT construct developed by duckworth et al., (2007) is essential to distinguish it from facets of the conscientiousness dimension of personality.

Broghammer, Sean M., (2017) in their research shows that GRIT may be a positive predictor of first year college grade point average and may increase the probability of predicting college success for students. Results of this study may assist enrollment managers and institutions of higher education to inform current admission practices and improve access to post secondary education through non cognitive variables.

Duckworth, Peterson, Matthews, & Kelly, (2007) GRIT is a personality trait defined as passion and perseverance in achieving long-term goals. It prompts a person to work hard when facing challenges, and enables him or her to put in effort and attentiveness into tasks over the years, regardless of failures and obstacles along the process.

Huppert, 2009; Mullins et al., (2017) in their research identified that the mental well-being may influence not only factors determining our perceptions, thoughts, and behaviors, but also our physiological wellbeing Through this study it is aimed

that include a mental well-being measure as a variable which will address the need of exploring the relationship between GRIT and psychological outcomes.

## **3. Rationale of the Study:**

There is an ample data available for role of grit and academic achievements, some studies reflect there is a positive impact, some doesn't shows correlation between GRIT and academic achievements, but there is no such research which talks about role played by academic institutions in improving and polishing GRIT among students.

## **4. Objective of the Study:**

The objective is to find out the impact of academic institutions have on GRIT among students of Indore City.

## **5. Hypotheses of the Study:**

H<sub>01</sub>: There exists no association between Professional College's and GRIT among students of Indore City.

H<sub>02</sub>: There exists no relation between Professional College's and GRIT among students of Indore City.

## **6. Research Design:**

6.1 Universe: Students from colleges of Indore City

6.2 Research type: Exploratory research has been used to explore the impact of academic institutions in improving GRIT among college students of Indore city

**6.3 Sampling Technique:** Convenient sampling has been used so that students who are easily approachable have been considered to collect the data.

**6.4 Sampling Unit:** Students of professional academic institutions have been considered as respondents for the study.

**6.5 Sample size:** Research instrument was floated to various colleges, but finally 121 respondents have been reverted with completed and error free questionnaire.

**6.6 Tool for data collection:** Primary survey has been conducted with the help of a self-

designed structured questionnaire and also 10-items GRIT scale Duckworth et.al (2007), was used to collect the data from the students. Reliability of the scale has been tested by using Cronbach's alpha. Value stands .922 (Table 1), of the self –structured questionnaire, which stands excellent to continue the research work.

**6.7 Tool for data analysis:** The collected data has been tabulated and analyzed through appropriate statistics tools using SPSS i.e. Cronbach's alpha, Correlation, & Regression, etc.

## 7. Data Analysis and Interpretation

### *Experiment: 7.1*

To check the reliability of Self-designed structured questionnaire.

Reliability of data has been checked through Cronbach's alpha using SPSS

Reliability Statistics (Table 7.1)		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.922	.921	25

From the above table is clear that, data is reliable to continue the research, and the value of  $\alpha=.922$ , which is excellent to pursue the research.

### *Experiment-7.2*

*H<sub>01</sub>: There exists no association between Professional College's and Grit among students of Indore City.*

Correlations (Table -7.2)

		College	Grit
Professional College	Pearson Correlation	1	-.121
	Sig. (2-tailed)		.185
	N	121	121
Grit	Pearson Correlation	-.121	1
	Sig. (2-tailed)	.185	
	N	121	121

From the above table it is clearly reflected that there is negative (-.12) correlation exists between professional colleges and GRIT, which infers that college environment, bears no association and hence plays no role in improving grit. In fact, the result explains that if college academics including curricular and co-curricular activities diminish GRIT among students. Thus the null hypotheses  $H_{01}$ : *There Exists no association between Professional College's and GRIT among students of Indore City is accepted.*

### Experiment-7.3

$H_{02}$ : *There exists no relation between Professional College's and Grit among students of Indore City.*

**Regression Model Summary (Table-7.3)**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.121 <sup>a</sup>	.015	.006	.70813	.015	1.779	1	119	.185

a. Predictors: (Constant), College

Above table 7.3 reflects the relationship between professional colleges's and GRIT among students. **R-Square is the proportion of variance in the dependent variable (GRIT) which can be predicted from the independent variables (Professional College). The value in the above table indicates that there exists positive but, only .12% association between the two variables.**

**ANOVA<sup>b</sup> (Table-7.4)**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.892	1	.892	1.779	.185 <sup>a</sup>
	Residual	59.672	119	.501		
	Total	60.564	120			

a. Predictors: (Constant), College

b. Dependent Variable: GRIT

From the above table 7, "f –value is 1.77" which means that only 1.7 % relationship exists between the two variables. Therefore it can be inferred that Yes, independent variable Professional College effects positively but slightly significant with the dependent variable GRIT. And hence the null hypotheses  $H_{02}$ : *There exists no relation between Professional College's and GRIT among students of Indore City stands rejected.*



## 9. Limitations of the Study

- i) The sample size was small, and convenient sampling may proved wrong to generalise the results.
- ii) Previous research works was not available.
- iii) Study is confined to college students only
- iv) Study has covered only colleges of Indore City

## 10. Conclusion of the study

**“When educators can build nation, why can’t they polish GRIT among students”.**

It is the prime responsibility of academic institutions to first analyse the inner skills like integrity, resilience and tenacity among the students, and then polish them accordingly. But is it really happening in all the colleges? Answer is No. All the academic institutions want gritty students but, they don’t want to work towards sharpening the students who have low level or no grit in them. This research work throws light on the professional education system and its relationship status with GRIT among college students of Indore city and the research concludes that, there exists only 1.7% relationship between professional colleges curriculum and activities with GRIT among students.

## 11. Scope & Implications of the Study

There is a lot of scope in this area of research like the study can be extended to large sample size, so that generalised results can be drawn. Study can be done at state and

then at national level, so that the results can be useful for academic institutions and professional colleges to frame the curriculum in a way that helps in improving the grit among students. As GRIT being the non-cognitive factor as stated by Angela Lee Duckworth in her study, plays an important role in designing the success in a student life. Hence, this study can be useful for researchers and academicians to further extend the research by taking schools, region, city or other allied courses as the universe of study.

## 12. References

- i) Broghammer, Sean M., "GRIT as a Predictor of Academic Success for First-Time Undergraduate Students" (2017). *Dissertations*. 463.  
  
<https://digscholarship.unco.edu/dissertations/463>
- ii) Christopoulou, Maria & Lakioti, Agathi & Pezirkianidis, Christos & Karakasidou, Eirini & Stalikas, Anastassios. (2018). The Role of GRIT in Education: A Systematic Review. *Psychology*. 09. 2951-2971. 10.4236/psych.2018.915171.
- iii) Duckworth, Angela & Peterson, Christopher & Matthews, Michael & Kelly, Dennis. (2007). GRIT: Perseverance and Passion for Long-Term Goals. *Journal of personality and social psychology*. 92. 1087-101. 10.1037/0022-3514.92.6.1087.

- iv) Huppert F. (2009). Psychological well-being: evidence regarding its causes and consequences. *Appl. Psychol.* 1 137–164.  
10.1111/j.1758-0854.2009.01008.x  
[CrossRef]
- v) Mullins A. J., Gamwell K. L., Sharkey C. M., Bakula D. M., Tackett A. P., Suorsa K. I., et al. (2017). Illness uncertainty and illness intrusiveness as predictors of depressive and anxious symptomology in college students with chronic illnesses. *J. Am. Coll. Health* 65 352–360.  
10.1080/07448481.2017.1312415  
[CrossRef]
- vi) Wechsler, D. (1955) Manual for the Wechsler adult intelligence scale. Psychological Corporation, New York.

## Case Study On Bhanwarilal Mithaiwala

*Ms. Ranjita Das Soni &  
Mr. Abhiraj Singh Chauhan*

### **Key Words: -**

Bhanwarilal Mithaiwala, a sweet food manufacturer from the State of Madhya Pradesh, India, had seen considerable growth in the last two decades. From a small time operator to a strong regional brand, Bhanwarilal Mithaiwala had come a long way heartened by its success in the market of Mhow, Madhya Pradesh.

The case traces the origin and growth of Bhanwarilal Mithaiwala, describes its vision, philosophy and strategy which portrays competition in sweet food industry. It also discusses company's experiences in the markets of Mhow and seeks suggestions for formulating strategies to enter the new market of Indore, Madhya Pradesh.

### **Bhanwarilal Mithaiwala**

#### **A guest for new horizons**

Rameshchand Saini, the key person of Bhanwarilal Mithaiwala, who first initiated the business, had every reasons to celebrate. The business that would enhance by 350 tons of sweet per year had been flagged off at Mhow, Madhya Pradesh. Rameshchand Saini always felt that pure and best quality production capacity of sweets is the key to enter and target the new markets. After seeing the rapid expansion of the markets in Indore, Rameshchand thought that

Bhanwarilal Mithaiwala would be able to expand its market beyond Mhow.

Bhanwarilal Mithaiwala, a Mhow based leading sweets manufacturing company was a family owned business run by the members of Saini family. From an insignificant start in 1945, Bhanwarilal Mithaiwala experienced a commendable growth. Over the time period, this business commanded a lion's share of the total sweet food market at Mhow and Indore, Madhya Pradesh

### **The Past**

Bhanwarilal Mithaiwala was started by Saini brothers Babulal & Rameshchand in the state of Rajasthan, India. They started their entrepreneurial zing in the year of 1935, with a sum of Rs 20,000 (entrusted by them). Initially, they started with the preparation of a basic sweet called batasha. The key ingredient of batasha was sugar, which was imported from other cities/states. Unfortunately the sugar imported and stored for the preparation of batasha was destroyed because of incessant rainfall in Rajasthan. After which there was a draught leading to less production of sugar. Due to continuous upheavals caused by nature they had a bad time at the initial stage of starting their business. However, both the brothers managed and survived their financial crises and decided to move to some other place. They stayed in Kolkata for two to four years after which they shifted to Delhi and stayed there for four more years.

Eventually, they both came to Mhow, Madhya Pradesh and took up a job which they pursued for eight years, till the death of Mr.Babulal. Afterwards the second brother

Mr. Rameshchand established a shop named **Babulal Bhanwarilal** in 1954.

In year 1971, the name of the shop was changed to **Bhanwarilal Mithaiwala**. Now the business had five partners (Rameshchand and the four sons of Babulal). The sons of Babulal are Naveen, Anil, Sunil and Praveen.

Gradually, they established two new shops at Mhow. To upgrade they opened one more shop which had superior infrastructure and facilities than the other two. All the products are manufactured and stored in the factory at Mhow. Packaging and dispatch to other shop for sale happened through the factory. Raw materials were also stored at the same place. Steady and continuous growth of their business led the partners think of the expansion. But they have expanded sufficiently for the town of Mhow. It was time to enter in the new markets of peripheral areas. A new shop at Indore was opened successfully.

All the shops are managed by all four sons of Mr.Babulal and overall business is run under the leadership of their Uncle Mr. Rameshchand. They equally participate in decision making.

Financial management, one of the most important aspect of any business was taken care very nicely. They have taken small loans to manage the financial requirements but never indulged in taking major loan for the business. Even now, they have maintained the quality of the products. They prepare sweets hygienically without adulteration. To ensure the quality, regular quality checks are also in place. In their factory, there is one lab, where they analyze and check their products through one

chemist before delivering it to the outlets. With time they have replaced containers and equipments which are used in the factory for sweets preparation.

### **Vision**

Bhanwarilal Mithaiwala had a simple vision that is **“to fulfill basic requirement of the consumers”**. Working towards this vision the Saini's added many varieties in the sweet food items which were in their product portfolio. Bhanwarilal offers different types of Sweets with different flavors to meet the varying needs of the customers. To meet the special demand, occasion based products were also added. Some of special products are sangam barfi, makkhan wada, milk cake, all the Bengali sweets. The sweets are prepared with pure mawa and milk which is liked by the consumers.

### **Operating Philosophy and strategy at Bhanwarilal Mithaiwala**

The Sainis followed what they called 'Quality for Money' strategy at Bhanwarilal Mithaiwala. Under this strategy the brothers worked towards providing good quality, healthy sweets, in right quantity at affordable prices to all their customers. Brothers believed that the 'Quality for Money' strategy would help them attract the customers in turn would help them increase their goodwill. Every possible efforts were made to ensure – quality, quantity, affordability of Bhanwarilal Mithaiwala. To ensure the high standards of quality at the plant, processes were underway to get ISO 9001 certification and FSSAI (Foods Safety and Standards Authority of India) approval.

Bhanwarilal Mithaiwala is also a certified executive member of the FSNM (Federation of Sweets and Namkeen manufacturers).

### **Products**

To ensure that Bhanwarilal products were of high quality, only the best ingredients sourced from some of the best suppliers within the country, were used in the preparation of Bhanwarilal sweets and namkeen. Raw materials like natural spices were sourced primarily from the spice state of Kerala, South India, Mawa is made by them only in their factory, hence it is always homemade. The milk is taken from local farmers who have contract with the Bhanwarilal, to deliver pure milk every time. All the dry fruits and kesar are sourced from Kashmir.

### **Price**

As a result of the 'Quality for money' strategy followed by the Sainis, all Bhanwarilal sweet products were reasonably priced but their prices are higher than their competitors. Bhanwarilal sweet products were priced nearly 20% - 30% more than their competitors, making them immensely attractive to the price sensitive local consumers and giving the business a distinct competitive advantage. Pricing under 'Quality for money' strategy made the products so affordable for the quality, that even an average salaried person could buy Bhanwarilal sweet products.

## **Promotion**

The Sainis had little or no faith in the merits of advertising and promotion. Rameshchand often reiterated that –

Bhanwarilal Mithaiwala had become a brand in Mhow, over the years, not because of any investments in advertising and promotion strategies but because of the attractive combination of quality, quantity and affordable prices offered to the consumers.

The Saini family believed that the combination of good quality, good quantity and affordable prices would help them win customers and remain relevant in the market. Sainis never spent on advertising and promotion. They believed that they are known to the customers because of the best quality products and that is the reason why they are loyal customers of the brand. The name is being promoted by mouth to mouth publicity by the customers to their friends and family. This is the best way of promotion wherein cost incurred is null, according to Saini Brothers. Therefore the Sainis never focused on advertising by their own resource.

## **Packaging**

From the plain hard paper box which they used initially to pack the sweets, now is available in plastic boxes, other attractive hard paper boxes. So that it can be carried and sent to other places. Another reason being it can be gifted easily on festivals or other occasions. From past many years, they are using less solvent packaging that helped in many ways. The improved packaging not only maintained the freshness and sweetness

of the sweets but also protected it from heat and dust. Ultimately improved packaging increased the shelf-life of the sweets which could now be stored for longer time duration. Lately, the Sainis had also been trying to make the packing of Bhanwarilal Mithaiwala more attractive and appealing. Sweets were now available in bright, vibrantly colored packets that competed strongly with the other packaged sweet food items being sold by the local shop keepers at Mhow.

## **Distribution**

Sainis never involved any dealers or retailers after the expansion. Reason being their products were only available in a localized market initially. Later the word was spread by the customers to other parts apart from Mhow, such as Indore, Dhar, Pithampur, Dewas, Ujjain and Bhopal. Sainis have direct selling of sweets to their consumers only and they don't allow any third party in between for distribution. From the factory the final sweets are distributed to all the outlets, and from there the sweets are sold to the final consumers.

## **Competition**

At Mhow, Madhya Pradesh sweet food industry was a complete mix of big and small local and regional players. A number of strong regional sweets brand existed along with a number of small local players. The market was however, dominated by the Sainis. Bhawarilal Mithaiwala were working towards increasing their presence at the Mhow sweet food market. Bhanwarilal

Mithaiwala never invested in any media to publicize. They had never promoted its products among the target audience. It does not have vast distribution network to gain widespread access in the market.

Bhanwarilal Mithaiwala never strive for new markets that would yield substantial profits. Mhow being a major market for Bhanwarilal Mithaiwala, therefore held a lot of attraction for them. A strong hold of Bhanwarilal Mithaiwala at Mhow market is only because of their goodwill and quality of products. While maintaining good quality in affordable price, they already competed with other sweet food industry. The Sainis believed that there was no real threat to their hold in the market of Mhow. In fact, their understanding for the local consumers made Rameshchand and the four partners believe that as long as they continued to provide good quality, healthy sweets in right quantity and at affordable prices to the customers no one would be able to displace Bhanwarilal from its dominant position in the Mhow market. Rameshchand felt that inspite of aggressive marketing strategies and heavy investment being made in advertising and promotion, it would be more important to win the local consumer's trust as their products were essentially high in quality with affordable price. The Sainis had become leaders in the Mhow sweet food market.

### **Venturing Beyond Mhow Madhya Pradesh**

Of late, the Sainis had been working towards expanding their markets beyond Mhow. The brothers felt that the market of Indore that had a good representation of Mhow would respond well to their products as the

consumers were familiar with brands Bhanwarilal Mithaiwala . Hence, with lot of optimism, Bhanwarilal Mithaiwala had introduced in the market of Indore to their belief, the products did good at Indore market, as a result the Sainis again gained goodwill in the market.

Bhanwarilal Mithaiwala as not in a state of mind or nor it is planning to expand more outlets in Madhya Pradesh, but if situation and future opportunity is there, they can see to it.

### **Sweet Food Industry In Mhow**

As per the legal business the Food department always used to make survey or test of products produced at Bhanwarilal Mithaiwala. They used to take sample of sweet to examine, but till now they had never found any fault or mistake in the products of Bhanwarilal. It was reported by them that the products of Bhanwarilal are safe, healthy and of good quality.

### **Questions**

Q.1. Considering the growing competition in food industry, what should be the strategy of product differentiation for Bhanwarilal Mithaiwala to sustain?

Q.2. Should Bhanwarilal Mithaiwala go for converting its brand into franchise system to extend its reach to other districts and states ?

Q3. 'Being all things to all people is or isn't the best business strategy'. Would it be beneficial for Bhanwarilal Mithaiwala to work upon product segmentation?

Q4. In the long run, will 'word of mouth' be enough for publicity? If not, what could be the next best promotion strategy for Bhanwarilal Mithaiwala?

## Call for Papers

**IMI Disha** : *The Guiding Light for Management Thinkers*, a bi-annual publication the peer reviewed and referred journal of Indore Management Institute, India. IMI Disha is a journal addressed to manager both in industry and in the government and non-profit organizations, and aims to disseminate the results of good research that are of relevance in their jobs and are capable of being applied. Its aim to provide a mix consisting of scholarly research papers and papers that are more conceptual and application-oriented. It does not confine itself to one functional area, but invites research paper relating to all areas of management.

Area of Management such as

- General Management
- Marketing
- Finance
- Organizational Behavior
- Human Resources
- Operations
- Domestic and Global Market Position Overview.
- Daily free newsletter will be provided

The journal also features research papers on various sectors like industry

- Agriculture
- Banking
- International Trade
- Urban and Rural Development
- Public Systems
- Information System

IMI Disha welcomes original high quality papers on management, business and organization issues from both academicians and practitioners. Paper based on theoretical/ empirical research/ experience should satisfy the criteria for good quality research but also must show the practical applicability and/or policy implications of their conclusions. All research papers are first screened at the editors' level, and those considered of sufficiently high quality are double blind referred by high quality reviewers who ensure a high standard of academic rigor in all the research papers. For further details please visit the website [www.imidisha.com](http://www.imidisha.com). You can send your research papers in the prescribed format to [imidisha@gmail.com](mailto:imidisha@gmail.com) or hardcopy to



**The Chief Editor,**

IMI Disha, Indore Management Institute and Research Centre,  
418, Milinda Manor, RNT Marg, Opposite to Central Mall, Choti Gwaltoli, Indore

**Subscription Rate**

<b>Print Subscription</b>	<b>One Year</b>	<b>Two Years</b>	<b>Three Years</b>	<b>Life time(15 yrs)</b>
Individual	Rs.400/-	Rs.1000/-	Rs.1600/-	Rs.6000
Academic	Rs.1000/-	Rs.2400/-	Rs.4000/-	Rs.10,000/-
Institution Corporate	Rs.1000/-	Rs.2600/-	Rs.4400/-	Rs.12000/-
International	US\$80	US\$140	US\$200	US\$500
Institution	US\$100	US\$160	US\$240	US\$600

Please accept the enclosed cheque/demand draft no. ....

Drawn on .....bank, favoring IMI DISHA payable at Indore.

Journal Mailing Address

Name : \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_

Country: \_\_\_\_\_ Pin: \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

Email: \_\_\_\_\_

Mail the completed form along with the cheque/draft to:

**IMI Disha, Indore Management Institute and Research Centre,  
418, Milinda Manor, RNT Marg, Opposite to Central Mall, Choti Gwaltoli. Indore**

**Phone : 8817777718**

**Email : [imidisha@gmail.com](mailto:imidisha@gmail.com)**

### **Information for Authors**

Our leadership comprises managers, public, private and not-for-profit sectors, consultant and academic & students of management schools of India and Abroad. We invite research papers relevant to this group, covering, and the fields of general management: corporate strategy, policy and government: finance, control and law: public policy; IT; Marketing; OB/HR: technology and manufacturing; and related areas like economics and social science. Research papers may be either conceptual or application oriented with a rigorous research methodology.

### **Editorial and Review Process**

DISHA is a referred journal. Research papers submitted for publication are initially screened by the editors for relevance to our readership, theoretical framework, and methodological rigorous ideas in a friendly format to our readership and highlight key insights and managerial implications of the proposed ideas in the manuscript stand a better chance for the advice consideration. Those considered appropriate are put through a double blind review, a process that may take from four to eight months. Authors may be asked to revise and resubmit a manuscript based on the referees' comments. Accepted research papers are edited to suit our format: author may consult the detail format and style guidelines.

Published research papers become the exclusive copy write of DISHA, which includes the write to electronic distribution. We regret our inability to provide detail comments on rejected manuscripts.

While DISHA cannot publish all the submission it receives, we appreciate the time invested and interest shown by the authors, academic and participation are encourage to share their work thought the various features of the journals

### **Other Details:**

1. The editors reserve the right to accept or refuse a research paper for publication, and they are under no obligation to assign reasons for their decision.
2. Authors will receive a complimentary copy of the review in which their research papers are published. They will also receive ten reprints of their research papers for where personal use. A regular reprint service is available and further copies as required may be obtained, or prior permission sought for limited and specified reproduction, on payment of prescribed charges.

■



***11 years of Academic Leadership***



Managerial  
skills

Building  
competencies

Challenges  
Flexibility  
Innovation  
Common goals

Make better  
decisions



On the horizon

Seeing is believing

**Courses Offered :**

**MBA | PGDM**  
**BBA | B.COM**  
**BA.LLB | LL.B**  
(Hons)                      (Hons)



**INDORE MANAGEMENT INSTITUTE  
AND RESEARCH CENTRE**

IMI Campus, Khandwa Road (Datoda),  
Opp. Chokhi Dhani, Indore



**INDORE MANAGEMENT INSTITUTE  
AND RESEARCH CENTRE**

**IMI Campus, khandwa Road (Datoda), Opp. Chokhi Dhani, Indore**  
**City Office : 418, Milinda Manor, RNT Marg, Indore**  
**Call : 8817777718, 9717265930**