



# Predictive Analysis Of The Performance Of Mid-Level Employees At Bharat Electronics Limited, Bangalore

Dr. Kuldeep Chhetri<sup>1\*</sup>, Dr. Chaya Bagrecha<sup>2</sup>, Dr. Shalini R<sup>3</sup>, Dr. Pujari Sudharsana Reddy<sup>4</sup>

<sup>1\*</sup>Associate General Manager, ADANI Defense Systems and Technologies Ltd. Hyderabad

<sup>2</sup>Professor-Faculty of Management Studies, Jain Deemed to be University

<sup>3</sup>Associate Professor-Faculty of Management Studies, Jain Deemed to be University

<sup>4</sup>Assistant Professor, Faculty of Management Studies, Jain Deemed to be University

**Citation** Dr. Kuldeep Chhetri et.al (2024) Predictive Analysis Of The Performance Of Mid-Level Employees At Bharat Electronics Limited, Bangalore *Educational Administration: Theory and Practice*, 30(5), 13899-13913  
Doi: 10.53555/kuey.v30i5.6118

## ARTICLE INFO

## ABSTRACT

The paper reviews the Competency framework at Bharat Electronics Limited (BEL), Bangalore for a mid-level employee and investigates a predictive framework that is based on multiple linear regression. BEL is a Defense Public Sector Undertaking awarded a *Navratna status* that manufactures electronics and weapons systems for the Indian armed forces. Presently, the performance management at BEL is based on Ernst & Young's (2016) assessment report, however with the changing expectations of business along with the shifting aspirations of employees, there is a need to re-evaluate the underlying constructs that lead to superior performance.

The authors have undertaken an exhaustive literature review and modified the existing competency framework to include additional constructs that relate to the personal profile of the employee. The data for the research was collected using a Structured Questionnaire for a sample size of 141 employees. EFA was applied to the 32 items of behavioral competencies and it emerged that seven factors contributed significantly to the Performance of employees. These factors were then subjected to multiple linear regression to predict the Performance. The finding of the regression indicated that the general model of multiple linear regression is statistically significant for two behavioral competency factors viz. *Passion for Achievement & Leveraging partnership*, *Drive for Excellence & Winning with change* along with *Technical competency* and *Emotional Intelligence*. Besides, four attributes related to personal profile viz. Tenure, Punctuality, Children and Health of the employee were also found to be statistically significant in determining Performance. The research findings are of significance for management in identifying the constructs of competencies and the attributes of personal profile that lead to higher Performance of employees and for policymakers to seize the opportunity conceptualized by the research work and formulate appropriate competency framework for their organizations.

**Keywords:** Behavioral Competencies, Bharat Electronics Limited, Defence Public Sector Undertaking, Exploratory Factor Analysis, Multiple Linear Regression.

**JEL Classification:** M12, M19, M51, O15

## INTRODUCTION

Competency modeling has emerged from a narrow application-based concept to be a leading catalyst for diagnosing, framing and improving processes of human resource management. The concept of Competency modeling lies at the heart of human resource management and has been the primary basis for HR processes such as Selection, Performance management & Assessment, Training & Development and Promotion management.

Today, every organization faces a fundamental challenge in identifying and developing the relevant competency model for its HR process. Recent research from Gallup indicates that 51% of US managers are not connected

with their work, while 55% are considering opportunities to join other organizations (Fernández-Aráoz, Roscoe, and Aramaki 2017). While this research depicts the dissatisfaction level at the managerial levels, the findings also reveal that 72% of these managers have the potential to rise to be C-suite executives. In this changing environment, where the competency models were earlier built on a list of generic qualities the existing models are unable to keep pace with the twin condition of shifting behavioral competencies of the employees and the fast-evolving technical competencies required at the workplace. These conditions are further amplified for the *new-gen* companies that are expanding fast and competing to be world leaders. The looming non-performance failure of the existing competency models is a *clarion call* for organizations to institute a paradigm shift in the way we define and continuously evaluate and update the constructs and processes of the Competency model (Ciobanu 2015)(Harlan and Cloete 2016)(Molobi, Kabiraj, and Siddik 2020).

Towards mitigating this ubiquitous gap, the authors have undertaken an empirical study at Bharat Electronics Limited, Bangalore to examine the efficacy of an existing competency framework and suggest constructs that would lead to the superior performance of employees at the workplace. The authors have attempted to extend the fundamental exploratory research to a more advanced level of predictive analysis by using multiple linear regression to determine the Performance of employees. The proposed research methodology may be utilized by organizations to serve as a conceptual building block for determining the Performance of employees based on their behavioral competencies.

## LITERATURE REVIEW

In the seminal paper "Testing for Competence rather than for intelligence" McClelland, postulated that traditional tests for evaluating academic knowledge and aptitude cannot alone predict the performance of an employee (McClelland 1973). In his assignment for the selection of Foreign Service Information Officers (FSIOs) with the US state department, Mc Clelland examined a two-pronged approach. The first was to use *Criterion Samples* which had superior performers as one sample lot and average/ poor performers as the other sample lot. The second was to identify employee thought- processes and the behavioral competencies that related causally to successful outcomes. This was implemented using the Behavioral Event Interview (BEI). The BEI combines Flanagan's Critical incident method along with the Thematic Apperception Test (TAT) and describes the method of activity requirements. The findings of the study led to a perspective change in the way organizations started approaching their HR processes.

During the late 1970s, a universal management competency framework titled Lancaster Model of Managerial Competencies was developed by Burgoyne and Stuart. The model constituted eleven competencies categorized in three levels viz. two foundation levels, five Skills and attributes and four basic knowledge & information. In the early 1980s, Richard Boyatzis reanalyzed the transcripts of Behavioral Event Interview (BEI) and observed that there were a set of competencies that were constantly characterized by superior managers across functions and organizations. Boyatzis noted that while undertaking task analysis, the central focus was only on the *Job* and there was no importance assigned to the person doing the job. This meant that though the models included an elaborate description of the job, they failed to include the competencies of the person doing this job. Boyatzis realized the existing gap and proposed a model that sought to establish a causal link between the Job and the competency of the person being assigned to do that job.

Since the mid-1990s, several efforts have been made to identify the dimensionality of performance that considers factors namely occupation, job, position, or work role (Campbell, J.P., McCloy, R.A., Oppler, S.H. and Sager 1993). As this idea of Competency became central to HR processes, it led to more than 100 researchers in twenty-four countries using the Competency Assessment Method (Spencer, L. & Spencer 1993). At the same time, Hager and Gonczi (Hager and Gonczi 1991) proposed competency-based standards for professions in the field of education. Drawing insights from the resource-based view of management, Lado explored the potential of human resource systems to facilitate/ inhibit the development and utilization of organizational competencies (Lado and Wilson 1994). Hogg, et al. have examined the competency standards being followed in certain European countries. During the examination of competencies, the authors noted that certain competencies appear time and again in various lists of management criteria or competencies (Hogg, B., Beard, D., & Lee 1994). This was followed by extensive research in the field of criterion measurement framework by Bartram leading to the meta-analysis of 29 validation studies postulated as the Great Eight factors (Bartram 2005).

Sanghi, in her research, has reviewed a Generic Competency model for leadership and HR and a Competency model for the Automobile industry (Sanghi 2007). The examples of competency models in certain government-run organizations have also been discussed. In another thought-provoking paper, Vakola et al. discuss a proactive approach to the competency that specifically aligns with the strategic business needs/ long-term future success of the organization (Vakola, Soderquist, and Prastacos 2007). Passow introspects on the multifaceted challenge that includes questions about learning goals, such as the competencies that are important for professional practice (Passow 2007).

In recent years, there has been considerable interest generated towards developing a predictive model for HR processes. The beginning of the 21<sup>st</sup> century has also seen several types of research in exploring the cognitive potential of employees concerning organizational fit (Ready, 2010; Zenger, 2017). Several consultancy models (Thomas, 2021; Bigby, 2018; Workitect, 2014) have laid a focus on the talent pipeline and management

strategies by gauging employees' potential through psychometric assessments and structured interviews. For example, the Thomas Model can predict the potential of an employee by assessing the time it will take for that employee to fit in a specific leadership role. Similarly, Pepermans (Pepermans, Vloeberghs, and Perkisas 2003) have developed a leadership potential model consisting of four quadrants viz Analytical Skills, Learning Agility, Drive and Emergent Leadership. The summary of popular competency models that have been used as the basis of the research is indicated in Table 1.

## **THEORETICAL FRAMEWORK**

### **RESEARCH GAPS**

During the research, the authors have examined several research papers, theses and popular competency frameworks/ models. Some of the popular models examined have been indicated in Table 1, these include the OECD Model, SHRM Model, ASTD 2013 Model and SHL UCF Model. Consequently, on analysing these models the authors have noted that while several consultancy firms have embarked to exhaustively study the organization's vision, mission and goals along with elaborate competency mapping exercises in a traditional manner other firms have employed a survey-based study using analytical tools/ applications.

During Focus group discussions, these models were discussed with the senior management of BEL(Bg). It was noted that the Behavioral Competency framework for BEL(Bg) had been formulated by Ernst and Young (E&Y) in Jul 2008 and implemented in 2016. The framework had identified the following nine competencies listed below: -

1. Seizing opportunities
2. Building and leveraging partnership
3. Winning with change and technology
4. Drives for excellence
5. Passion for achievement
6. Customer centricity
7. Effective influencing
8. Active learning
9. Engaging and energizing teams.

After several rounds of deliberations with BEL(Bg), the authors inferred that there was a requirement to review the efficacy of the above competencies. The authors post extensive discussions have consequently proposed the following nine independent variables: -

1. Leadership (**L**)
2. Interpersonal and Communication (**IC**)
3. Creativity and Innovation (**C**)
4. Planning and Execution (**PE**)
5. Decision making and Problem Solving (**DPS**)
6. Conflict Management (**CM**)
7. Customer Centricity (**CC**)
8. Team Orientation (**TO**)
9. Active Learning (**AL**)

### **RESEARCH OBJECTIVES & HYPOTHESES**

The primary objective of the study was to review the existing Competency framework at BEL, Bangalore and propose latent constructs of behavioral competencies that affect the performance of a mid-level employee. It further aims to suggest an appropriate model to enable the prediction of the employee's performance. The objective of the study was hypothesized as: -

**H<sub>1</sub>**: The latent constructs of behavioral competencies are significantly different from the proposed nine behavioral competencies.

**H<sub>2</sub>**: There is a positive relationship exists between the latent constructs of competencies and the personal profile of employees with Performance.

## **RESEARCH METHODOLOGY**

### **STUDY SETTING**

The study was conducted in BEL, Bangalore. BEL is a Navratna Company and a flagship Defence Public Sector Undertaking (DPSU) established in 1954. The DPSU has nine units that are geographically located across the country viz. Bangalore, Ghaziabad, Pune, Machilipatnam, Panchkula, Kotdwara, Navi Mumbai, Chennai, and Hyderabad. The selected setting at Bangalore is significant as Bangalore is the largest campus of BEL, comprising a total of nine Strategic Business Units.

### **POPULATION AND SAMPLE**

BEL(Bg), has a total of 1104 mid-level employees viz. 1417 Grade IV (Deputy Managers) and 627 Grade V (Managers). The representative sample size was determined by using Sample Size Calculator for multiple regression developed by Daniel Soper (Soper n.d.). For an effect size of 0.15, Desired statistical power of 0.8,

Number of predictors as 09, and Probability level of 0.05 the minimum sample size was found to be 113. The sample size calculations using Soper's calculator is shown in Figure 3.

A Stratified Random Sampling was adopted to elicit information from all the nine SBUs of BEL(Bg). A total of 200 Questionnaires were distributed to the nine SBUs through the Central HR. The Questionnaire was further distributed within the SBU at random. Having considered the prevailing model at BEL(Bg) the sample frame for the study has considered the distribution of Questionnaires to the mid-level management comprising of deputy managers and managers. A total of 141 samples were collected for the study.

### **SURVEY QUESTIONNAIRE**

The Questionnaire comprised 50 items. Discussions with the research guide, Subject Matter Experts (SMEs) and the literature survey helped generate the Measurement scale. Based on the above inputs and the literature review the Questionnaire was divided into eight clusters. These are Personal Data (08 items), Technical Competency (01 item), Behavioral Competencies (32 items), Performance (01 item), Training & Development (02 items), Critical Incident (01 item), Emotional Intelligence (01 item) and Organization Vacancies (04 items). The list of items for Behavioral competencies is indicated in Table 2.

### **EMPIRICAL ANALYSIS AND RESULTS**

#### **DESCRIPTIVE STATISTICS**

The personal profile of the employees included eight attributes viz. Job, Tenure, Gender, Age-group, Marital status, Children in higher classes, Punctuality status and Health. Details of the breakdown of each attribute is indicated in Table 3.

#### **EXPLORATORY FACTOR ANALYSIS**

The EFA was undertaken for the 32 behavioral competencies. The Kaiser-Meyer-Olkin (KMO) value of 0.659 and Bartlett's test of sphericity with a p-value < 0.05 were found which were acceptable (Hair, J.F., Black, W.C., Babin, B.J., & Anderson 2010). Further, the communalities were all above 0.3, thereby confirming that each item shared some common variance with the other. Consequently, 28 items relating to behavioral competencies were factor analysed using Principal Component Analysis (PCA) with Varimax rotation. Details are indicated in Table 4.

The value of Cronbach's Alpha of seven factors calculated was found to be between 0.751- 0.874. The factor loading, % Variance explained, eigenvalue and Cronbach's alpha are indicated in Table 5. A summary of the seven factors along with the nomenclature and their associated items is indicated in Table 6.

#### ***Factor 1: Passion for Achievement & Leveraging partnership***

Factor 1 had a Cronbach's alpha of 0.869 and explained 13.5% of the variance with an eigenvalue of 12.1. Details are indicated in Table 5. This factor characterized competencies strongly related to Planning & Execution, Team orientation, Interpersonal and Communication.

#### ***Factor 2: Energizes team through Self-example***

Factor 2 had a Cronbach's alpha of 0.872 and explained 13.1% of the variance with an eigenvalue of 2.5. Details are indicated in Table 5. This factor characterized competencies strongly related to Interpersonal & Communication, Integrity and Resilience.

#### ***Factor 3: Drives for Excellence & Winning with change***

Factor 3 had a Cronbach's alpha of 0.874 and explained 12.6% of the variance with an eigenvalue of 1.9. Details are indicated in Table 5. This factor characterized competencies strongly related to Visionary leadership, Decision making and Mentoring.

#### ***Factor 4: Seizes Opportunity***

Factor 4 had a Cronbach's alpha of 0.858 and explained 10.9% of the variance with an eigenvalue of 1.5. Details are indicated in Table 5. This factor characterized competencies strongly related to Leadership viz. Strategic thinking, Business acumen, Ability to manage the external and internal environment, Developing people and being a Team player.

#### ***Factor 5: Engages the team for meeting the objective***

Factor 5 had a Cronbach's alpha of 0.751 and explained 10.1% of the variance with an eigenvalue of 1.4. Details are indicated in Table 5. This factor characterized competencies strongly related to Leveraging diversity, Conflict management, Planning and Accountability towards work.

#### ***Factor 6: Active Learning & Effective influencing***

Factor 6 had a Cronbach's alpha of 0.859 and explained 9.4% of the variance with an eigenvalue of 1.1. Details are indicated in Table 5. This factor characterized competencies strongly related to Active learning, Flexible leadership style, Planning & Execution and Oral communication.



### Factor 7: Customer Centricity & Creativity

Factor 7 had a Cronbach's alpha of 0.782 and explained 7.4% of the variance with an eigenvalue of 1.1. Details are indicated in Table 5. This factor characterized competencies strongly related to Customer centricity and Creativity.

### Results

The score (Anderson Rubin) for each employee was calculated based on the seven behavioral competencies obtained from the EFA. The percentage factor score in the pie chart provides an insight into the prominent competencies of the employee. Also, for better appreciation the spider chart has been used to provide a multivariate presentation of these competencies in two dimensions. The loading of each factor and spider chart have been depicted in Figure 4 and Figure 5 respectively.

### MULTIPLE LINEAR REGRESSION ANALYSIS

Multiple regression was performed to evaluate the predictive ability of seven factors of behavioral competencies, technical competency, emotional intelligence and personal profile of the employee on Performance. The first step was to test the assumptions of Normality, Linearity, Homoscedasticity, Multicollinearity and Independence of residuals. Table 7 presents the normality test using the statistics for Skewness and Kurtosis viz.  $Z_{Skewness} = Skewness / SE_{Skewness}$  and  $Z_{Kurtosis} = Kurtosis / SE_{Kurtosis}$ . For the critical value of  $\pm 1.96$  with an error level of 0.05 the obtained statistics, were found to be within an acceptable range (Hair, J.F., Black, W.C., Babin, B.J., & Anderson 2010). This was further visually verified by observing the PP plot and histograms presented in Figure 6 and Figure 7, which indicates close fitment along the Normality line (Ghasemi and Zahediasl 2012).

Figure 8 presents a scatter plot diagram to test the linearity between the variables. The test visually indicates that all the factors exhibit linearity with each other and hence the assumption of linearity is satisfied. Similarly, the scatter plot between  $Z_{pred}$  and  $Z_{res}$  presented in Figure 9 indicates that the homoscedasticity criterion was satisfied for the dataset (Gignac, G. 2019). Table 8 presents the tests for multicollinearity using Tolerance and VIF values. All the Tolerance  $> 0.2$  and VIF  $< 5$ , thus suggesting that the assumption of "no multicollinearity" was satisfied (Gaur, A., & Gaur 2009). Table 9 presents the Independence test using Durbin Watson statistics between the standardized predicted values and the standardized residuals (Gignac, G. 2019). The test statistic  $D = 1.887$  ( $D > 1$ ,  $D < 3$  are acceptable) indicates uncorrelated residuals and therefore the data satisfies the independent error assumption (Kothari, C., R., & Garg 2016).

Stepwise regression was conducted using Mini Tab Statistical Software and a total of eight independent variables were found to be significant contributors in predicting the Performance of the employees. These included two factors of behavioral competencies viz. BCF1 (Passion for Achievement & Leveraging partnership), BCF3 (Drives for Excellence & Winning with change) along with technical competency, emotional intelligence and four categorical factors of personal profile viz. tenure, children, punctuality status and health. Table 9 presents the results of the Model summary. The R-square value of 61.85% indicates that the explanatory variables account for 61.85% of the variability in the dependent variable Performance, leaving about 38.15% of variability that is accounted for by other factors not included in the model. However, a substantial difference in the R-square (61.85%) and adjusted R-square (57.95%) suggests that a large number of predictor variables in the model are reducing the consistency of Model-fit.

The results of ANOVA in Table 10 indicate that the general model of multiple linear regression is significant  $F(13, 127) = 15.84$ ,  $p\text{-value} = 0.000$  ( $p < 0.05$ ). The results support the assumption that the combined contribution of the latent constructs of competencies and personal profile of employees of independent variables considered have a significant impact on the Performance of the employee.

The results of the beta coefficients in Table 11 indicate the individual contribution of the explanatory variables on to the dependent variable Performance. Further, the p-value for the coefficient of the considered eight independent variables is all significant at a 5% significance level. The results support hypothesis  $H_2$  that a positive relationship exists between the latent constructs of competencies and the personal profile of employees with their Performance.

Table 11 contains the multiple regression results of BCF1, BCF3, technical competency, emotional intelligence, tenure, children, punctuality status and health. The OLS equation for predicting the performance of the employee was found to be -

$$\begin{aligned} \text{PERF} = & -1.598 + 0.1775 \text{ TC} + 0.3389 \text{ BCF1} + 0.5138 \text{ BCF3} + 0.1917 \text{ EI} + 0.0 \text{ Tenure}_1 \\ & + 0.010 \text{ Tenure}_2 + 0.061 \text{ Tenure}_3 + 0.475 \text{ Tenure}_4 + 0.0 \text{ Punctuality}_2 \\ & + 0.040 \text{ Punctuality}_3 + 0.656 \text{ Punctuality}_4 + 0.957 \text{ Punctuality}_5 + 0.0 \text{ Health}_2 \\ & + 0.343 \text{ Health}_3 + 0.0 \text{ Children}_1 + 1.225 \text{ Children}_2 - 0.139 \text{ Children}_3 \end{aligned}$$

As evident from above regression equation, the Performance is highly affected by changes in BCF3 (0.5138), BCF1 (0.3389) and moderately affected by TC (0.1775) and EI (1917). Similarly, the Performance is highly affected by changes in personal profile of the employee viz. Children  $_2$  (1.225), Punctuality  $_5$  (0.957), Punctuality  $_4$  (0.656), Tenure  $_4$  (0.475), Health  $_3$  (.343), moderately affected by Children  $_3$  (-0.139) and

lowly affected by Tenure\_1 (0.0), Tenure\_2 (0.010), Tenure\_3 (0.061), Punctuality\_2 (0.0), Punctuality\_3 (0.04), Health\_2 (0.0) and Children\_1 (0.0).

## DISCUSSIONS AND CONCLUSIONS

The initial part of the study conducted at BEL (Bg) has revealed that the latent constructs of behavioral competencies were significantly different from the proposed nine behavioral competencies. The subsequent regression analysis has revealed that, of the seven factors of behavioral competencies obtained through EFA, only two factors viz. BCF1 (Passion for Achievement & Leveraging partnership), BCF3 (Drives for Excellence & Winning with change) are significant contributors in predicting the Performance of employees. These two behavioral competencies along with technical competency, emotional intelligence and four categorical factors of personal profile viz. tenure, children, punctuality status and health contributed significantly with a moderately high R-square value of 61.85%. Other five behavioral factors that were found to be non-significant were BCF2 (Energizes team through Self-example), BCF4 (Seizes Opportunity), BCF5 (Engages the team for meeting the objective), BCF6 (Active Learning & Effective influencing) and BCF7 (Customer Centricity & Creativity). Besides, it was also found that the Performance of employees was independent of Designation (Managers/ Deputy Manager), Gender (M/ F), Age Group and Marital Status.

## LIMITATIONS OF THE STUDY

While the study model examines behavioral competencies of mid-level employees viz. Deputy managers and Managers at BEL campus, Bangalore, it is unable to relate these findings to other similar DPSUs. This limitation is drawn from the arguments of several researchers that the customized model for one organization may not be directly implementable for another organization (Sanghi 2007). Besides, the research methodology has limitations and its accuracy is highly dependent on the perception of the rater in rating his subordinate, the number of responses used for study, and the varying profile of the employee under consideration viz Planning/ Research/ Production/ Testing/ Quality Assurance.

## IMPLICATION OF THE STUDY

Recent years have witnessed an extensive emphasis on indigenization and "Make in India" campaigns to boost local manufacturing and production. However, despite the government reforms the Indian companies have been unable to leverage this opportunity. Closer scrutiny reveals that several of the bottlenecks can be obviated by an efficient HR system in place. The research paper delves into the legacy competency framework of BEL, Bangalore, and reveals that with time the factors governing the behavioral competencies also change. These findings have a major implication for organizations to be agile and in tandem with the environment.

## FUTURE STUDIES

It is recommended that the future scope of the study may include a longitudinal study at all the DPSUs to validate/ amend the constituents of behavioral competencies in their respective organizations. Structural analysis of the model obtained shall also be useful to study the causal effect of these factors on Performance.

## REFERENCES

1. Bartram, Dave. 2005. "The Great Eight Competencies: A Criterion-Centric Approach to Validation." *Journal of Applied Psychology* 90(6):1185–1203.
2. Campbell, J.P., McCloy, R.A., Oppler, S.H. and Sager, C. E. 1993. "A Theory of Performance." Pp. 35–70 in *Personnel Selection in Organizations*, edited by W. C. Schmitt, N. and Borman. San Francisco: Jossey-Bass Publishers.
3. Ciobanu, Alina. 2015. "Civil Servants' Recruitment and Selection Practices in European Union Member States." *Management Research and Practice* 7(3):21–33.
4. Fernández-Aráoz, Claudio, Andrew Roscoe, and Kentaro Aramaki. 2017. "Turning Potential into Success: The Missing Link in Leadership Development." *Harvard Business Review* 2017(November-December):1–11.
5. Gaur, A., & Gaur, S. 2009. *Data Analysis Using SPSS*. 2 nd. New Delhi: SAGE Publication India Pvt. Ltd.
6. Ghasemi, Asghar, and Saleh Zahediasl. 2012. "Normality Tests for Statistical Analysis: A Guide for Non-Statisticians." *International Journal of Endocrinology and Metabolism* 10(2):486–89.
7. Gignac, G., E. 2019. *How2statsbook*. 1st ed. Perth, Australia: Online.
8. Hager, Paul, and Andrew Gonczi. 1991. "Competency-Based Standards: A Boon for Continuing Professional Education?" *Studies in Continuing Education* 13(1):24–40.
9. Hair, J.F., Black, W.C., Babin, B.J., & Anderson, R. E. 2010. *Multivariate Data Analysis*. 7th ed. New Jerson: Pearson Prentice Hall.
10. Harlan, and Alva Cloete. 2016. "Human Resource Development in Local Government : A Management Perspective." *Human Resource Development in Local Government a Management Perspective* (December).
11. Hogg, B., Beard, D., & Lee, G. 1994. "Competencies." *Journal of Individual and Organisation Assessment*

- Centre 45–73.
12. Kothari, C., R., & Garg, G. 2016. *Research Methodology: Methods and Techniques*. 3rd ed. New Delhi: New Age International (P) Limited.
  13. Lado, A. A., and M. C. Wilson. 1994. "Human Resource Systems and Sustained Competitive Advantage : A Competency-Based Perspective Author ( s ): Augustine A . Lado and Mary C . Wilson Source : The Academy of Management Review, Vol . 19, No . 4 ( Oct ., 1994 ), Pp. 699-727 Published by : Aca." *The Academy of Management Review* 19(4):699–727.
  14. McClelland, D. C. 1973. "Testing for Competencies Rather than for Intelligence." *American Psychologist* 28:1–14.
  15. Molobi, Lemohang, Sajal Kabiraj, and Md. Nur Alam Siddik. 2020. "Behavioural Intention Factors Influencing Sharing Economy Innovations: An Exploratory Research of Uber in South Africa." *Metamorphosis: A Journal of Management Research* 19(1):42–58.
  16. Passow, Honor J. 2007. "What Competencies Should Engineering Programs Emphasize? A Meta-Analysis of Practitioners' Opinions Informs Curricular Design." *Proceedings of the 3rd International CDIO Conference* (MIT, Cambridge, Massachusetts, USA.): June 11-14.
  17. Pepermans, Roland, Daniël Vloeberghs, and Britt Perkisas. 2003. "High Potential Identification Policies: An Empirical Study among Belgian Companies." *Journal of Management Development* 22(7–8):660–78.
  18. Sanghi, S. 2007. *The Handbook of Competency Mapping: Understanding, Designing and Implementing Competency Models in Organizations*. New Delhi: SAGE Publication India Pvt. Ltd.
  19. Soper, DS. n.d. "A-Priori Sample Size Calculator for Multiple Regression [Software]." 2021. Retrieved May 2, 2021 (<https://www.danielsoper.com/statcalc>).
  20. Spencer, L. & Spencer, S. 1993. *Competence at Work: Models for Superior Performance*. New York: Wiley.
  21. Vakola, Maria, Klas Eric Soderquist, and Gregory P. Prastacos. 2007. "Competency Management in Support of Organisational Change." *International Journal of Manpower* 28(3–4):260–75.

## Appendix

**Table 1.** Popular Competency Models

<b>Literature Citation</b>	<b>Criterion Areas/ Competencies</b>
Burgoyne and Stuart	The three levels of Competency have a total of 11 total competencies. These include Basic Knowledge (02 Nos), Skills & Attributes (05 Nos) and Meta Qualities (06 Nos).
Personal Competency Framework (PCF)	In the late 1980s, the Job Competencies Survey (JCS) was formulated. Based on JCS, the PCF was developed.
The Hogan Competency Model	Four domains considered are Intrapersonal Skills, Interpersonal Skills, Technical Skills, and Leadership Skills. The model is based on the Job evaluation tool that has five sections viz the Competency Evaluation Tool (CET) having 56 competencies and the four Hogan inventories ie Hogan Personality Inventory (HPI), Hogan Development Survey (HDS), Motive, Value, Preference Inventory (MVPI) and Hogan Business Reasoning Inventory (HBRI).
Indian Civil Services	Department of Personnel and Training (DoPT) for the Indian Civil Service (ICS) has steered the Competency-based Human Resource Management (HRM). In this framework, the 25 Competencies in Civil Services Competency Dictionary have been categorized into four pillars namely Ethos, Ethics, Equity, and Efficiency.
OECD Model	The OECD Competency Framework constitutes fifteen Core Competencies grouped into three clusters viz. Delivery-related Competencies, Interpersonal Competencies, Strategic Competencies.
SHRM	SHRM framework provides a broad summary of actions associated with each of the Competencies/ key behaviors associated with that proficiency.
ASTD 2103	The six foundation competencies are Business Skills, Global Mindset, Industry Knowledge, Interpersonal Skills, Personal Skills, and Technology Literacy.
SHL Universal Competency Framework (UCF) (Bartram, 2012).	The <i>Great</i> eight competencies are Leading and deciding, Supporting and cooperating, Interacting and presenting, Analysing and interpreting, Creating and conceptualizing, Organizing and executing, Adapting and coping, Enterprising and performing.

**Source:** The authors.

**Table 2.** Description of Items of Survey

Ser	Behavioral Competency	Item Descriptor
1.	Leadership Competencies	L1: Vision.
2.		L2: Stretches & Drives to Achieve.
3.		L3: Business Acumen.
4.		L4: Manages Internal & External Environment.
5.		L5: Develops People and is a Team Player.
6.		L6: Thinks and Acts Strategically.
7.		L7: External Awareness.
8.		L8: Flexibility.
9.		L9: Resilience.
10.	Interpersonal and Communication	IC1: Interpersonal Skills.
11.		IC2: Oral Communication.
12.		IC3: Integrity/Honesty.
13.		IC4: Written Communication.
14.	Creativity and Innovation.	CI1: Creative.
15.		CI2: Innovative. (Removed)
16.	Planning and Execution.	PE1: Financial Management.
17.		PE2: Accountability.
18.		PE3: Partnering.
19.		PE4: Political Savvy.
20.		PE5: Influencing/ Negotiating.
21.		PE6: Entrepreneurship.
22.		PE7: Technology Management.
23.		PE8: Human Capital Management. (Removed)
24.		PE9: Public Service Motivation. (Removed)
25.		PE10: Leveraging Diversity.
26.	Decision Making and Problem Solving.	DPS1: Decisiveness.
27.		DPS2: Problem Solving. (Removed)
28.	Conflict Management	CM: Conflict Management.
29.	Customer Centricity.	CC1: Customer Service.
30.	Team Orientation.	TO1: Team Building.
31.		TO2: Developing Others.
32.	Active Learning.	AL1: Continual Learning

**Source:** The authors.

**Table 3.** Breakdown of Personal Profile of Sample ( $N=141$ )

	Criteria	Frequency	Percentage
<b>Job</b>	Manager	69	48.9
	Deputy Manager	72	51.1
<b>Tenure (in years)</b>	>3	99	70.2
	2 – 3	15	10.6
	1 – 2	15	10.6
	<1	12	8.5
<b>Gender</b>	M	99	70.2
	F	42	29.8
<b>Age (in years)</b>	>40	36	25.5
	35 – 40	36	25.5
	30 – 35	63	44.7
	25 – 30	6	4.3
<b>Marital Status</b>	Married	114	80.9
	Non-married	24	17
	Divorce	3	2.1
<b>Children in higher Class X, XI, XII</b>	One	18	12.8
	Two	9	6.4
	Nil	114	80.9
<b>Punctuality Status</b>	Always Punctual	60	42.6
	Very Punctual	57	40.4
	Satisfactory	18	12.8
	Not Punctual	6	4.3
	Never Punctual	0	0.0
<b>Health Status</b>	No issues	114	80.9
	Minor issues	27	19.1
	Major issues	0	0.0

**Source:** The authors.



**Table 4.** KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy	0.659
Bartlett's Test of Sphericity <b>df</b>	378
<b>Sig.</b>	0.000

**Source:** The authors.

**Table 5.** Factor Loading from Exploratory Factor Analysis

	1	2	3	4	5	6	7
PE7	.713						
PE3	.712						
IC4	.656						
TO2	.648						
PE5	.615						
L9		.806					
PE1		.712					
TO1		.668					
IC3		.585					
IC1		.503					
L2			.819				
DPS1			.743				
L8			.667				
L1			.638				
L6				.861			
L4				.630			
L3				.579			
L5				.1411			
PE10					.712		
CM1					.605		
PE2					.600		
AL						.705	
PE6						.668	
L7						.662	
PE4						.658	
IC2						.511	
CC							.776
C1							.620
% Variance explained	13.5	13.1	12.6	10.9	10.1	9.4	7.4
Eigen Value	12.1	2.5	1.9	1.5	1.4	1.1	1.1
Cronbach's Alpha	0.869	0.872	0.874	0.858	0.751	0.859	0.782

**Source:** The authors.

**Table 6.** Summary of Factors (Total Items=28)

Factor	Nomenclature	No of items	Items Considered
Factor 1	Passion for Achievement & Leveraging partnership	5	PE7, PE3, IC4, TO2, PE5
Factor 2	Energizes team through Self-example	5	L9, PE1, TO1, IC3, IC1
Factor 3	Drives for excellence & Winning with change	4	L2, DPS1, L8, L1
Factor 4	Seizes Opportunity	4	L6, L4, L3, L5
Factor 5	Engages the team for meeting the objective	3	PE10, CM1, PE2
Factor 6	Active Learning & Effective influencing	5	AL1, PE6, L7, PE4, IC2
Factor 7	Customer Centricity & Creativity	2	CC1, C1

**Source:** The authors.

**Table 7.** Normality Test

Variables	Skewness	Std. Error of Skewness	Kurtosis	Std. Error of Kurtosis	Z <sub>Skewness</sub>	Z <sub>Kurtosis</sub>
Desig	-.043	.204	.203	.406	-0.21	0.50
Tenure	-.284	.204	.768	.406	-1.39	1.89
Gender	.325	.204	.722	.406	1.59	1.78
Age Group	-.213	.204	-.772	.406	-1.04	-1.90
Marital Status	.265	.204	.608	.406	1.30	1.50
Children	-.370	.204	.297	.406	-1.81	0.73
Punctuality	-.378	.204	.226	.406	-1.85	0.56

Health	-.359	.204	.520	.406	-1.76	1.28
TC	-.082	.204	-.289	.406	-0.40	-0.71
BCF1	-.921	.204	.722	.406	-4.51	1.78
BCF2	-.373	.204	-.374	.406	-1.83	-0.92
BCF3	.051	.204	-.628	.406	0.25	-1.55
BCF4	-.299	.204	-.732	.406	-1.47	-1.80
BCF5	-.248	.204	-.290	.406	-1.21	-0.72
BCF6	-.290	.204	-.457	.406	-1.42	-1.13
BCF7	-.353	.204	.556	.406	-1.73	1.37
EI	-.155	.204	-.396	.406	-0.76	-0.98
PERF	.400	.204	-.175	.406	1.96	-0.43

Source: The authors.

**Table 8.** Multicollinearity Test

el	Unstandardized Coefficients		Standardized Coefficients		t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta				Tolerance	VIF
(Constant)	-3.909	.813			-4.810	.000		
TC	.138	.069	.174		1.989	.049	.463	2.162
BCF1	.123	.105	.145		1.174	.243	.233	4.294
BCF2	-.147	.090	-.175		-1.630	.106	.308	3.245
BCF3	.577	.106	.755		5.423	.000	.183	5.469
BCF4	-.002	.103	-.002		-.020	.984	.246	4.061
BCF5	-.012	.087	-.015		-.138	.891	.318	3.140
BCF6	.218	.100	.262		2.172	.032	.244	4.100
BCF7	.225	.088	.303		2.557	.012	.252	3.966
EI	.143	.069	.156		2.088	.039	.636	1.571
Desig	.210	.118	.148		1.785	.077	.517	1.936
Tenure	.166	.054	.230		3.103	.002	.643	1.556
Gender	-.005	.115	-.003		-.043	.965	.648	1.544
Age Group	-.099	.072	-.125		-1.387	.168	.438	2.282
Marital Status	-.204	.118	-.132		-1.740	.084	.617	1.622
Children	-.131	.071	-.133		-1.836	.069	.673	1.485
Punctuality	.512	.099	.594		5.186	.000	.270	3.703
Health	.470	.144	.260		3.268	.001	.558	1.792

**Note.** Dependent Variable: PERF

Source: The authors.

**Table 9.** Independence Test & Model Summary

S	R-sq	R-sq(adj)	R-sq(pred)	10-fold S	10-fold R-sq	Durbin-Watson
0.462	61.85%	57.95%	55.50%	0.477669	54.84%	1.887

Note. Dependent Variable: PERF

Source: The authors.

**Table 10.** ANOVA Table for Overall Multiple Linear Regression

Source	DF	Adj SS	Adj MS	F-Value	P-Value
Regression	13	44.0611	3.38931	15.84	0.000
TC	1	2.1255	2.12548	9.93	0.002
BCF1	1	4.1413	4.14126	19.36	0.000
BCF3	1	7.5565	7.55648	35.32	0.000
EI	1	2.0610	2.06101	9.63	0.002
Tenure	3	4.5585	1.51952	7.10	0.000
Punctuality	3	7.2595	2.41984	11.31	0.000
Health	1	1.6272	1.62717	7.61	0.007
Children	2	7.2757	3.63785	17.00	0.000
Error	127	27.1730	0.21396		

Note. Dependent Variable: PERF

Source: The authors.

**Table 11.** Beta Coefficient of Multiple Linear Regression

Term	Coef	SE Coef	T-Value	P-Value	VIF
Constant	-1.598	0.609	-2.63	0.010	
TC	0.1775	0.0563	3.15	0.002	1.68
BCF1	0.3389	0.0770	4.40	0.000	2.74
BCF3	0.5138	0.0865	5.94	0.000	4.26
EI	0.1917	0.0618	3.10	0.002	1.50
Tenure					
2	0.010	0.191	2.25	0.026	2.29
3	0.061	0.200	2.30	0.022	2.51
4	0.475	0.156	3.04	0.003	3.36
Punctuality					
3	0.040	0.252	2.06	0.041	4.68
4	0.656	0.258	2.54	0.012	4.56
5	0.957	0.280	3.41	0.001	2.66
Health					
3	0.343	0.124	2.76	0.007	1.58
Children					
2	1.225	0.248	4.93	0.000	1.66
3	-0.139	0.121	-2.58	0.011	1.50

**Note.** Dependent Variable: PERF

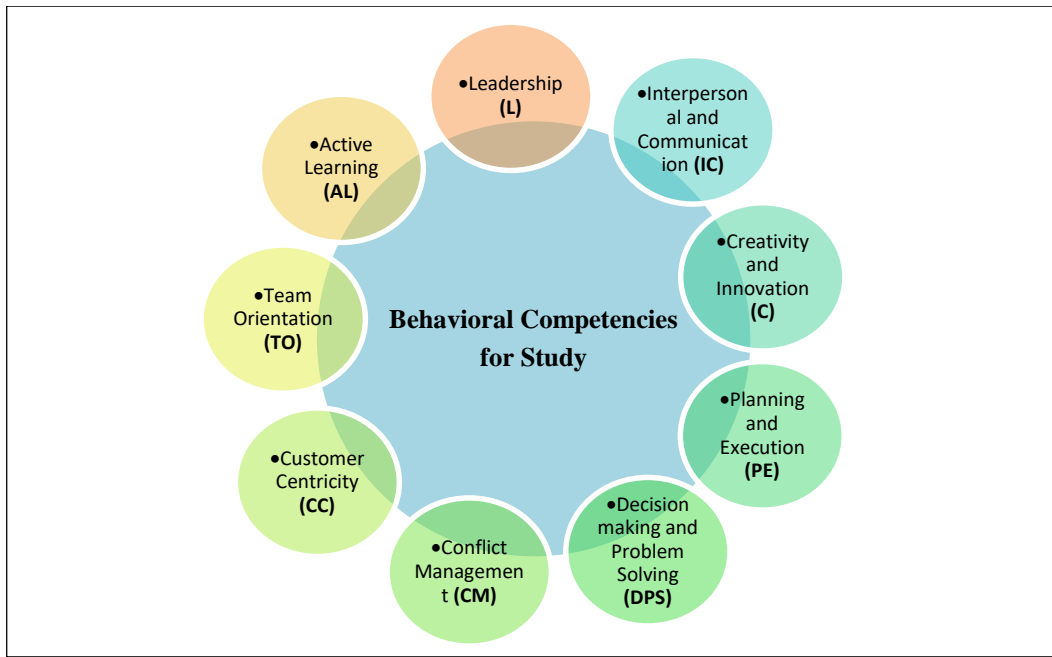
**Source:** The authors.

**List of figures**



**Figure 1.** Behavioral Competencies in the Competency Dictionary of BEL(Bg)

**Source:** E&Y report for BEL (2008).



**Figure 2.** Factors Considered in the Behavioral Competencies for Study

**Source:** The authors.

The screenshot shows a web-based calculator titled "A-priori Sample Size Calculator for Multiple Regression". It includes the following text and fields:

This calculator will tell you the minimum required sample size for a multiple regression study, given the desired probability level, the number of predictors in the model, the anticipated effect size, and the desired statistical power level.

Please enter the necessary parameter values, and then click 'Calculate'.

Anticipated effect size ( $f^2$ ):

Desired statistical power level:

Number of predictors:

Probability level:

Minimum required sample size: 113

**Figure 3.** Factors Considered in the Behavioral Competencies for Study

**Source:** <https://www.danielsoper.com/statcalc/default.aspx>

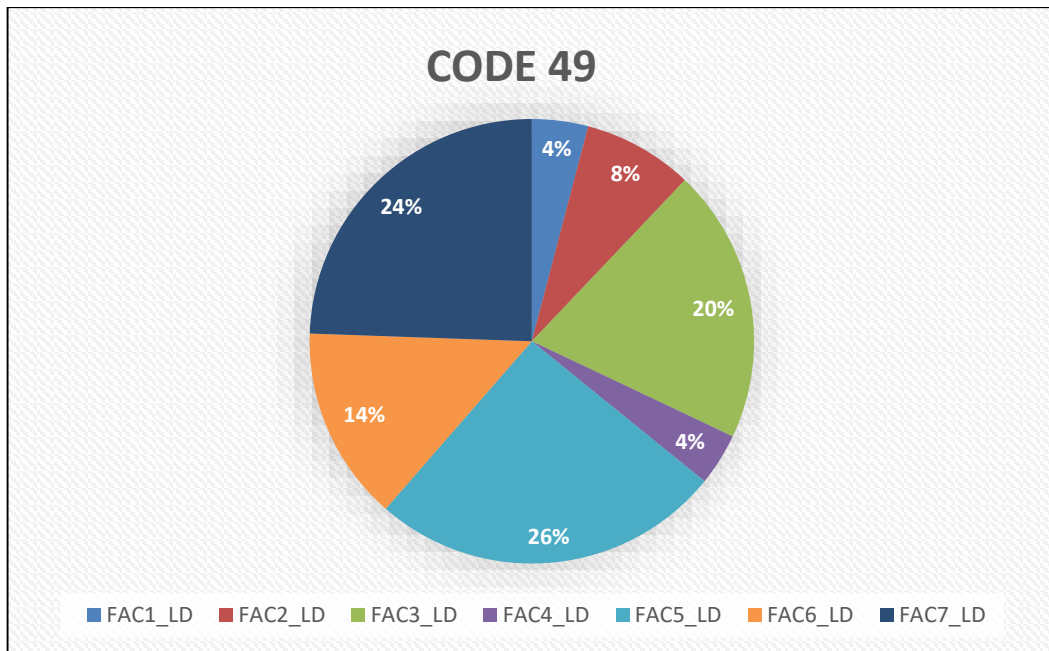


Figure 4. Loading of each of the Seven Factors

Source: The authors.

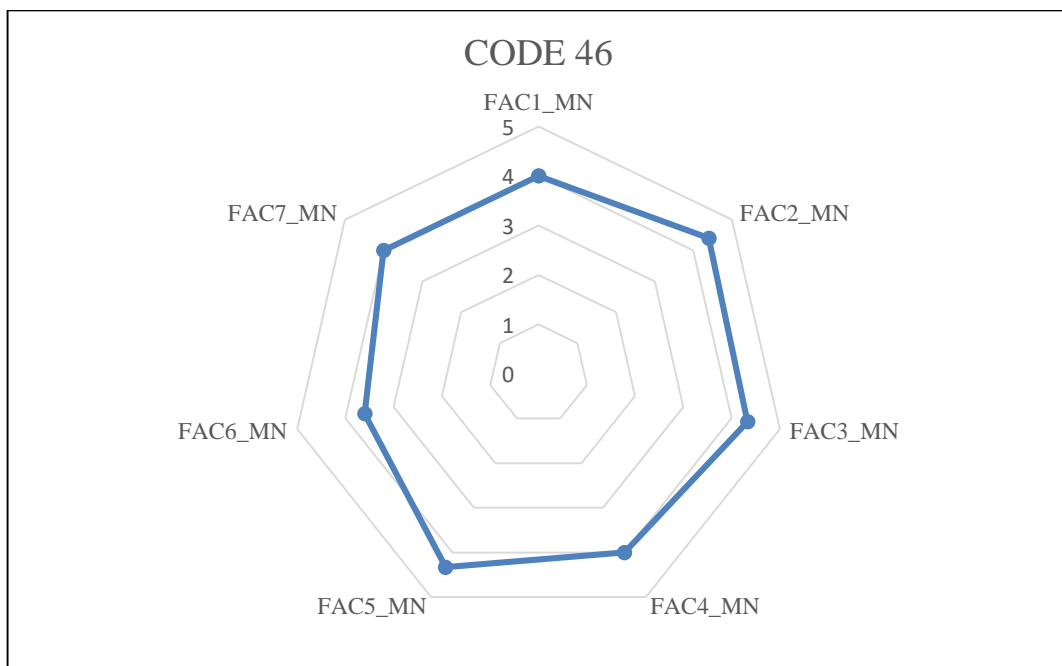
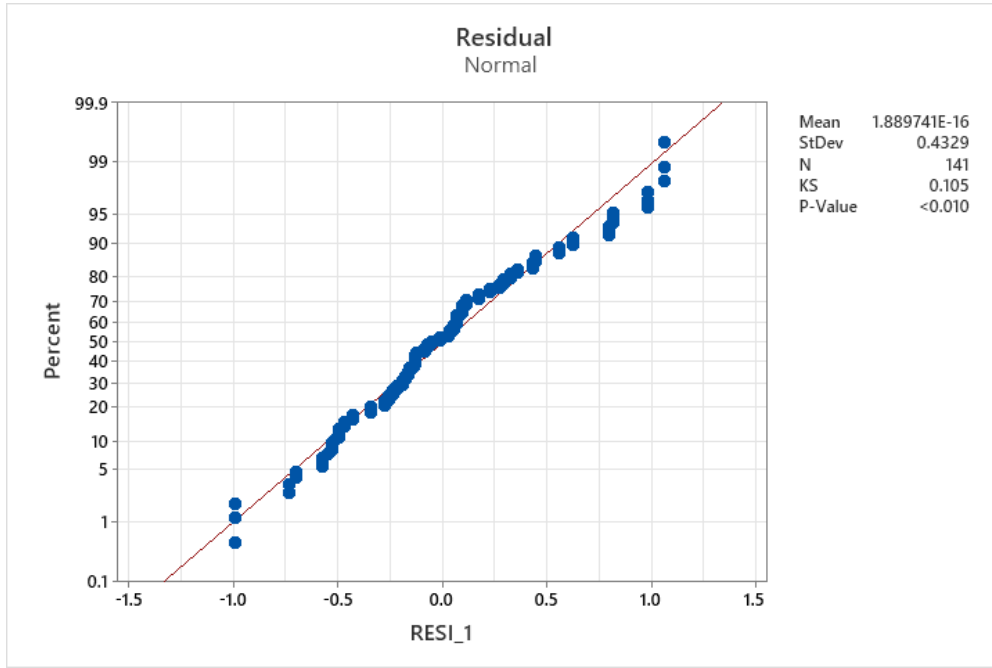


Figure 5. Factor Score of Code 46 Employee

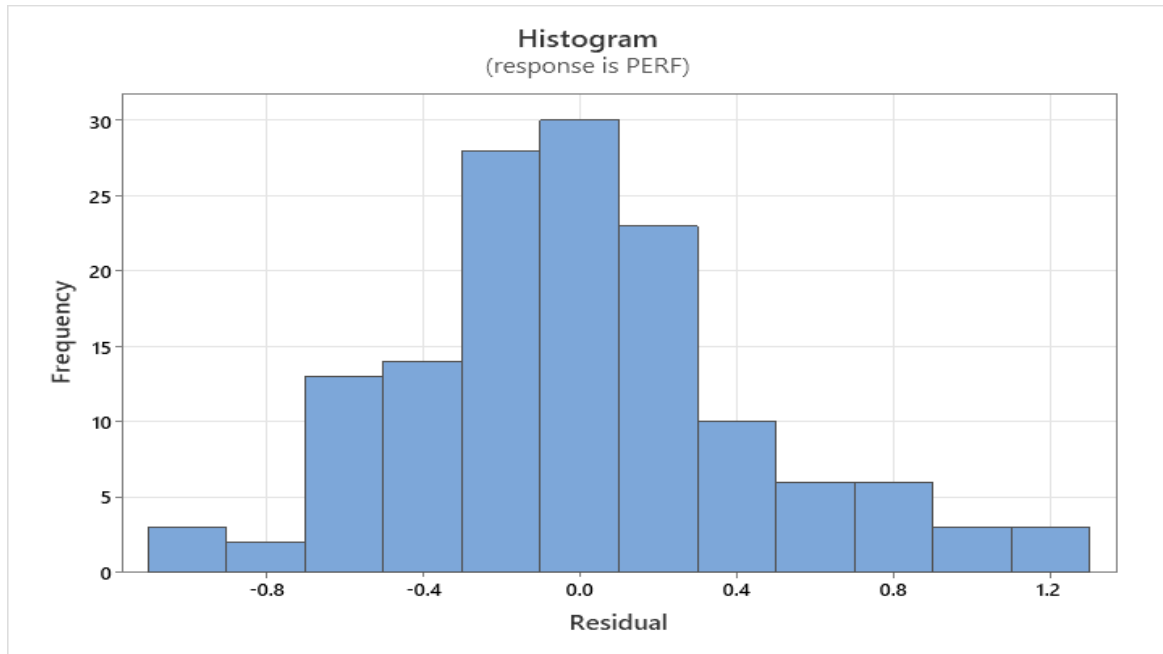
Source: The authors.





**Figure 6.** Normality Test of Residual

**Source:** The authors.



**Figure 7.** Histogram of Residual

**Source:** The authors.

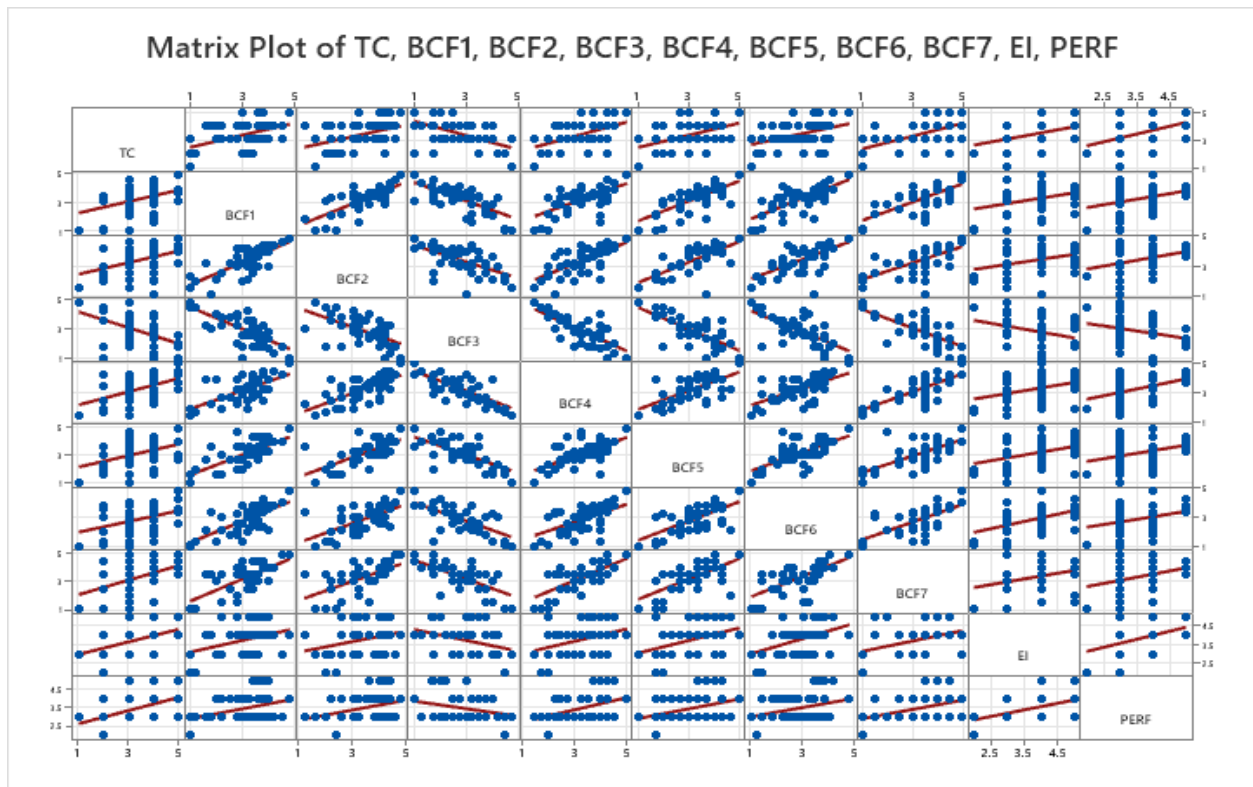


Figure 8. Linearity Test

Source: The authors.

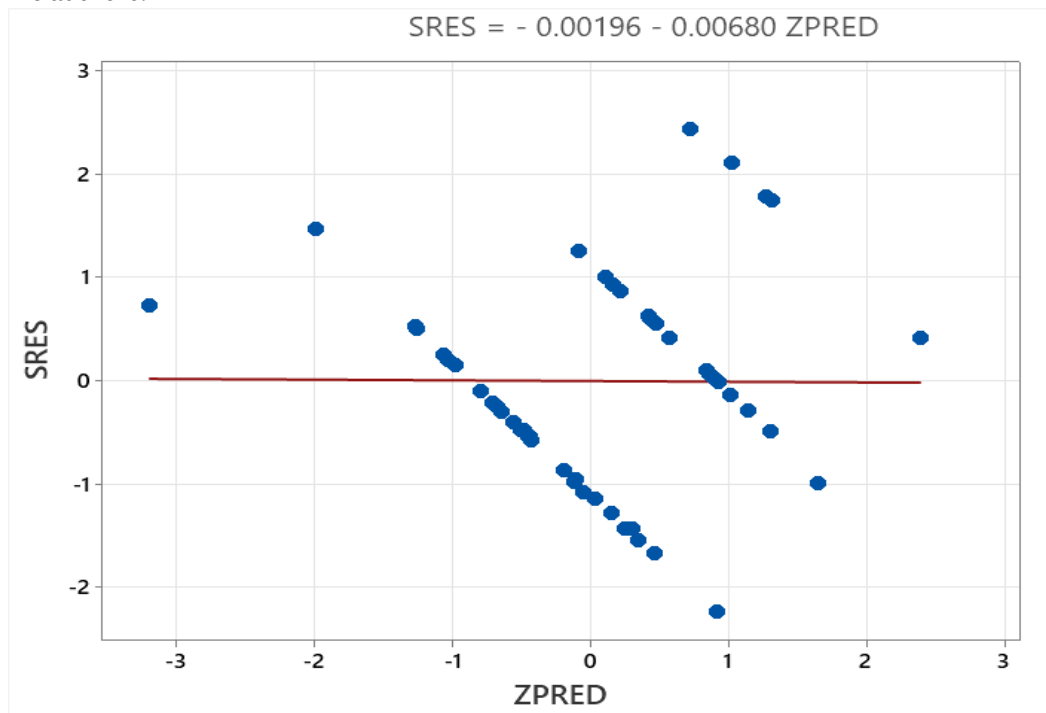


Figure 9. Homoscedasticity Test

Source: The authors.