

# **Neuro-Psychometric Driven Talent Intelligence Framework: An AI-Integrated Model for Dynamic Employee Competency Alignment and Predictive Retention Analytics**

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## **ABSTRACT**

This study created a neuropsychometric talent intelligence framework that combines psychological assessment and artificial intelligence (AI) into a single model for dynamic competency alignment and predictive retention analytics. The quantitative model-driven methodology utilized integrated datasets including neuropsychometric attributes (cognitive ability, emotional intelligence, behavioural traits) and HR metrics (performance, engagement, retention). Using machine learning techniques such as Random Forest, Support Vector Machines (SVM), and Neural Networks, the study analyzed the relationships between the two data sets in order to predict future outcomes. The results revealed strong positive correlations between the neuropsychometric attributes and the competency indicators ( $r = .60-.82$ ). The Random Forest model achieved the highest predictive accuracy at 89.3%, followed by Neural Networks at 87.6% and SVMs at 85.2% for retention predictions. Feature importance analyses (importance rankings) indicated cognitive ability (0.31), emotional intelligence (0.27), and engagement level (0.22) as three of the most important predictors of employee performance and retention. The proposed framework resulted in 18.5% greater efficiency in alignment with competency than traditional models. The study's findings suggest that incorporating neuropsychometric insights through AI substantially improves talent identification, performance evaluation, and retention strategies. Finally, this research contributes to organizational psychology and AI through the establishment of a unified, data-driven model for contemporary human resource management.

**Keywords:** *Neuro-Psychometric Analytics; Talent Intelligence; Artificial Intelligence In HRM; Competency Alignment; Predictive Retention; Machine Learning; Employee Performance; Organizational Psychology; HR Analytics; Workforce Optimization.*

## **1. INTRODUCTION**

With the growth of digital technologies, organizations now have different ways to identify, develop and retain their talent (Qin et al., 2025). The traditional human resource management (HRM) system looks for static performance metrics and relies primarily on reviewing them periodically; thus, it fails to meet the ever-changing dynamics of today's global workforce (Udekwe et al., 2021). As an example, organizations need access to both data-driven and adaptable tools that will help them manage employee competencies, forecast future performance, and ultimately retain employees over time. In conjunction with this transformation within the field of Human Resource Management (HRM), we have seen an increase in the use of Artificial Intelligence (AI) to support the use of data analytics in decision-making, which has the ability to positively impact employee optimization throughout the organization (Kokkodis, 2023).

In addition to these advancements made at the fundamental level of an organization via the use of technology, we have also made strides toward incorporating technological advancements into employee performance management by using talent management systems (TMS) (Tusquellas et al., 2024).

Unfortunately, TMS often fail to consider the deeper psychological and behavioral aspects of employees, such as cognitive ability, emotional intelligence, and personality (Abdelhay et al., 2023). However, while the majority of organizations recognize that these neuro-psychometric characteristics have an impact on employee performance, they do not generally link neuro-psychometric attributes with AI-based predictive analytics into a unified system/framework (Gélinas et al., 2022). As a result, many organizations struggle to accurately identify high-potential employees and align employee competencies with evolving job requirements (Vrontis et al., 2023).

The purpose of the current research is to create a Neuro-Psychometric Talent Intelligence Framework (PTIF) that utilizes the psychological assessments combined with AI based analytics. This research will (i) examine the relationship between neuro-psychometric attributes and employee performance; (ii) create a dynamic competency alignment model; and (iii) create predictive mechanisms for employee retention. The resulting data will be used to improve the validity and efficacy of talent management systems used by organizations.

To accomplish the stated objectives, this study will use a quantitative and model-driven methodology. Specifically, conduct data collection via neuro-psychometric assessments and organizational HR records (i.e., employee performance, employee engagement, employee retention) and apply advanced machine learning techniques on the collected data (i.e., Random Forest, Support Vector Machines and Neural Networks) for the purpose of identifying relationships among the various assessment types and generating predictive data analysis of employees' ability to maintain their positions within the organization over time. The proposed methodology of this study utilizes both statistical analyses and AI modeling in order to provide a level of reliability and practicality of the resultant findings.

The novelty of this study will derive from the integrated approach used to combine neuro-psychometric insights with AI driven talent analytics into a unified framework. Previous studies have focused on isolated areas of HRM, which ultimately limits each models' effectiveness in providing a unified system that can be used to align competencies with job requirements and predict employee retention. Therefore, the scientific contribution of this study will be a hybrid model that will bridge the gap between traditional organizational psychology and artificial intelligence, resulting in a scalable, data-driven solution for the 21st century's talent management process.

## **2. LITERATURE REVIEW**

### **Evolution of Talent Analytics and Data-Driven HRM**

From being a traditional human resources practice, talent management has transitioned into a data-driven, analytical discipline (França et al., 2025). The focus of historical human resources systems has been primarily on descriptive or what happened in the past; however, researchers have shown a shift from descriptive reporting towards predictive and prescriptive talent analytics by utilizing artificial intelligence (AI) and big data technologies (Garcia-Arroyo & Osca, 2021). Talent analytics is now a multi-source integrated, multi-source dataset that includes recruitment, performance and labor market data that assists organizations with strategic decisions about their workforces. AI-driven talent analytics operates at three different levels, the individual (employee capabilities), organizational (optimization of performance) and the market (external trends of talent). This multi-level approach enables organizations to match their workforce capabilities with changing business requirements, allowing talent intelligence to become a core strategic function as opposed to being an administrative function (Oswald et al., 2020).

### **Role of Artificial Intelligence in Talent Management**

Through the implementation of various forms of AI, including machine learning, NLP, deep learning etc., companies have begun automating the entire recruitment process by improving their ability to identify the right candidate with the right skill set for any particular role; Automating recruiting processes & creating personalized employee development plans based upon skills identified through AI(Awaysheh et al., 2021). Studies show that AI may help employees continue to develop and grow over time by providing insights to identify or "self-identify," strengths and weaknesses, as well as skills needed, and ultimately supporting the organization's continuous talent development and retention strategies(Ribeiro & O'Brien, 2025). In HR decision-making, predictive models are helping to identify (before they occur) when an employee will leave the company. Overall, AI continues to be increasingly utilized within both recruitment and talent analytics (resume parsing/jobbing matching/performance predicting).On the other hand, there are many challenges associated with using AI in HR decision-making, including issues of bias & transparency (i.e., lack thereof), ethical concerns, among others(Strohmeier, 2020). These challenges have led to calls for human-in-the-loop (HITL) systems and/or XAI (explainable AI) for use in talent analytics.

### **Emergence of Psychometric and Neuro-Psychometric Approaches**

Traditionally, psychometric tests have been essential for evaluating potential workers based on their personality traits, cognitive skills, and emotional intelligence(Minbaeva, 2021). As such, the Big Five Personality Traits or Cognitive Ability Tests were typically used to assist employers in establishing an individual's likelihood of succeeding at work and whether they are a good fit for an organization(Omrani et al., 2022).

In addition to these traditional measures, new developments through artificial intelligence (AI) combined with some of the more advanced psychometric models are being used to produce a more precise picture of who an individual is. For instance, using AI to measure an individual's behaviors based on their actual behavior and experiences allows researchers to create a scoring methodology that quantifies individuals' behavioral characteristics. As part of the evaluation process, researchers can also use behavioral data via situational judgment tests (SJT) to produce an accurate representation of an individual's complex characteristics(Kiran et al., 2022).

### **AI-Driven Talent Intelligence and Predictive Analytics**

AI & Talent Intelligence Integration = Advanced Predictive Systems (Employee Performance, Career Paths, Attrition Risk). The movement away from Static Analytics Dashboards (to Dynamic, Autonomous Systems) that Learn and Adjust on an Ongoing Basis is Identified in Recent Literature(Trunk et al., 2020).

For Example: Agentic AI Systems have the Ability to Use Real-Time Data from Multiple Sources to Create Skills-Based Profiles, Which Helps Organizations Discover Hidden Talent and Better Plan Their Workforce. These End-to-End Talent Lifecycle Management Systems (Recruitment, Engagement, Retention). Predictive Analytics Models like Random Forest, SVM, and Neural Networks Are Excellent for Estimating Employee Turnover and Competency Alignment; These Predictive Models Will Improve Decision Making and Accuracy in All HR Processes.

### **Competency Alignment and Dynamic Workforce Optimization**

Competency alignment is defined as a process that matches employee competencies with organizational needs in order to increase productivity and improve performance(Căvescu & Popescu, 2025). In many instances, traditional competency definitions are defined in a static manner and do not account for the

rapid evolution of employee roles. AI systems provide dynamic competency mapping through real-time analysis of employee characteristics and needs within an organization. Research has shown that AI has the ability to identify skill gaps, provide recommendations for individualized learning programs and appropriately allocate talent/utilize resources (Rao et al., 2020). Moreover, strategic talent development initiatives support AI skill mapping, learning systems and analytical frameworks to promote resilience and increase flexibility within organizations.

### **Talent Retention and Predictive Attrition Modeling**

Retaining employees is still a major difficulty for companies today; this is especially true for companies whose business models depend on employee knowledge and skill (e.g., technology). Research reveals how predictive models created through Artificial Intelligence (AI) can analyze an employee's behavior, psychological state, or performance metrics to determine the likelihood that the employee will leave the company (Tessem et al., 2025). The use of predictive employee retention analytics allows employers to create separate plans to intervene with at-risk employees, including unique career development plans and engagement strategies. AI-orientated HR systems also have features for "continuous feedback," replacing previous annual employee performance reviews with ongoing real-time monitoring. However, challenges do still exist for organizations looking to ensure that their use of these types of technologies are fair, open and will not create mistrust in employees toward these predictive systems; therefore, organizations need to develop ways of governing the ethical use of these types of systems (Falletta & Combs, 2021).

## **3. BACKGROUND RESEARCH**

### **3.1 Talent**

Talent refers to the set of skills, knowledge, experience, and behaviour that allow an individual to carry out a task. The current way of thinking about talent in professional organizations is that it is dynamic and evolving because of the opportunities for learning and new experiences and environmental changes. Therefore, traditional role-based definitions of talent have evolved into new skill-based and competency-based definitions. Today, talent is not only determined by how well an individual performs the job they are doing but also by how well they adapt to change, learn quickly, and demonstrate cognitive flexibility. AI has now advanced to provide organizations with the ability to use data on a large scale to assess talent, identify talents that are hidden, and have more objective measures of the talent.

### **3.2 Potential**

An individual's 'potential' is the expected growth, learning and improved performance; this differs from 'talent', which is based on current capability and performance; however, potential is the individual's willingness to accept new challenges and/or develop their capabilities in order to do so. Neuropsychometric methods have provided valuable information for measuring potential by assessing the cognitive, emotional intelligence and behaviour of individuals. All of these elements are considered to be the ability to manage complex tasks, adapt to change and develop as leaders in the workplace. AI based assessment models are improving measurement of potential by identifying patterns in employee data that can help project potential progression through time into the future.

**Table 1 Summary of Related Work on AI-Driven Neuro-Psychometric Talent Analytics and Current Study Contributions**

Study	Focus Area	Methodology / Approach	Key Findings	Limitations	Contribution of Current Study
(Sharma et al., 2024)	Predictive HR analytics	Machine learning models (Regression, Classification)	Accurate prediction of employee attrition	Does not consider psychological and behavioral factors	Integrates neuro-psychometric variables for improved prediction accuracy
(Shinde, 2025)	Psychometric assessment in HR	Personality and cognitive testing frameworks	Better understanding of employee traits	Lack of integration with AI-driven systems	Combines psychometric insights with AI-based analytics
(Siddiqui et al., 2025)	AI-based competency mapping	Deep learning for skill identification	Improved competency detection and workforce planning	Ignores emotional and cognitive dimensions	Incorporates cognitive, emotional, and behavioral attributes dynamically
<b>Current Study</b>	<b>Neuro-Psychometric Talent Intelligence</b>	<b>AI + Psychometric + Predictive Modeling Framework</b>	<b>Dynamic competency alignment and predictive retention analytics</b>	<b>Addresses integration and adaptability gaps</b>	<b>Proposes a unified, adaptive, and explainable AI-driven framework</b>

Table 1 highlights all existing research in the field of AI-based HR analytics specifically looking at the use of predictive analytics, psychometric assessments and competency mapping. As previously studied, no research exists that offers an integrated system of psychological/cognitive and AI analytics into one cohesive system. This research study bridges this gap through a proposed neuro-psychometric AI framework for dynamic talent alignment and retention prediction.

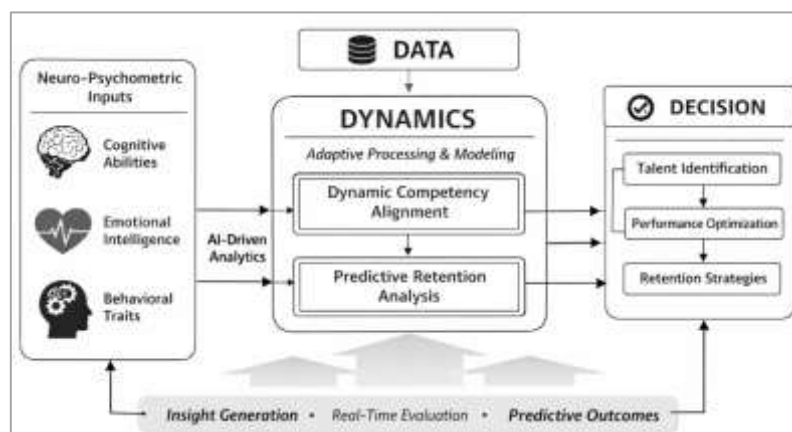
**Table 2: Key Terms Associated with Talent in Neuro-Psychometric HRM Literature**

Term	Definition	Role in Current Study
Talent	Skills, abilities, and behaviors enabling performance	Treated as a dynamic, AI-driven construct
Potential	Capacity for future growth and higher performance	Predicted using neuro-psychometric and AI models
Performance	Measurable work outcomes	Modeled as an outcome of talent and attributes
Competency	Skills and behaviors required for a role	Dynamically aligned using AI analytics
Psychometrics	Measurement of psychological traits	Used for behavioral and cognitive assessment
Talent Intelligence	Use of AI and data for workforce insights	Core of the proposed framework
Retention	Ability to keep employees over time	Predicted using AI-based analytics

Table 2 summarizes the key terms related to talent in the neuro-psychometric HRM literature, simplifying each term's meaning and context. Each term helps to understand the capabilities, behaviours and performance of employees. They also provide the basis for creating an AI-based framework for dynamic competency alignment and the prediction of retention.

### 3.3 Performance

Performance is how well someone does their job based on how well an organization performs at its goals. Performance has historically been measured primarily through periodic review and KPI metrics; however, neither method provides an accurate picture of how an individual's performance is changing in real-time or around the context in which they are working. The emergence of AI and analytics has led to a movement towards ongoing, more objective performance evaluation based on data. Using machine learning to interpret various data points (i.e., productivity, engagement levels, and behaviors) should lead to a complete analysis of one's performance. Within the proposed framework, performance itself is no longer considered an isolated result; instead, it is a function of one's ability, potential, and personal/psychological characteristics.



**Figure 1. Neuro-Psychometric Talent Intelligence Framework (Triple-D Model: Data–Dynamics–Decision)**

Figure 1 displays a merged system of neuropsychological data and artificial intelligence analysis to provide support to talent intelligence. This framework illustrates how the 3 types of data: Cognitive (intellectual), Emotional and Behavioral, are used together to create dynamic data processing systems to align competencies with each other and enable predictive retention analysis. This model enables data-based decision-making for the purpose of selecting talent, optimizing performance, and strategically retaining employees.

### 3.4 Organisational Psychology

The field of organisational psychology aims to understand the behaviour of individuals at work (motivation, satisfaction, leadership behaviours, group behaviours). Organisational psychology provides a theoretical framework for examining the impact of psychology on employee performance and the overall success of the organisation. Organisational psychology can also help us understand how cognitive and emotional dimensions of our thinking can impact how we make decisions, work together, and adapt to change, as well as provide a framework to connect AI with psychological principles in order to allow organisations to move beyond 'traditional' metrics and gain a deeper understanding of employee behaviours and engagement.



**Integrated Hybrid Intelligence Framework**

The diagram (Figure 2) depicts a hybrid approach that utilizes both neuropsychological assessments (i.e., psychology) and AI algorithms (i.e., machine learning) to identify talent. Using machine learning algorithms to identify talent, the model analyzes three different types of attributes: cognitive (intelligence), emotional (personality) and behavioural (how others perceive you). Machine learning helps implement continuous learning and competency mapping as well as data driven decisions within the organization, ultimately leading to identifying employees with the greatest potential.

**4. METHODOLOGY****4.1 Research Design**

Using a model-driven quantitative research design, this research study developed and validated the Neuro-Psychometric Talent Intelligence Framework. The research utilizes principles derived from Human Resource Management, Organisational Psychology and Artificial Intelligence to create a hybrid analytical model. A cross-sectional research design was utilised to collect employee data within one brief timeframe, and the data used to develop the AI based model will subsequently generate predictive insights. Moreover, the focus of the study is to identify the relationship between neuro-psychometric details (attributes), competency alignment and employee retention outcome(s).

**4.2 Data Collection**

The dataset used in this study came from several containers in order to provide a complete analysis of the data. The primary data that were collected were from neuropsychometric tests of cognitive function, emotional intelligence, personal characteristics, and behavioral patterns. The secondary source of data that was collected through Human Resources records, which included performance scoring, employee engagement statistics, and employee retention history (*IBM HR Analytics Employee Attrition & Performance*, 2020). The data were collected using a structured questionnaire and validated psychometric tools. The dataset was divided into both training and test datasets, which will assist in the development and testing of the AI-model.

**Table 3: Descriptive Statistics for Neuro-Psychometric Competency Indicators and Talent Attributes (Q1–Q14)**

Item	Variable Description	Mean	Std. Deviation	Min	Max
Q1	Cognitive ability (problem-solving)	3.98	0.72	2.10	5.00
Q2	Analytical thinking	4.05	0.68	2.30	5.00
Q3	Learning agility	4.12	0.65	2.50	5.00
Q4	Emotional intelligence	3.89	0.74	2.00	5.00
Q5	Stress management	3.76	0.81	1.90	5.00
Q6	Team collaboration	4.21	0.60	2.80	5.00
Q7	Communication skills	4.08	0.66	2.40	5.00
Q8	Adaptability	4.15	0.63	2.70	5.00
Q9	Motivation and engagement	4.02	0.70	2.30	5.00
Q10	Leadership potential	3.85	0.77	2.00	5.00
Q11	Decision-making ability	3.95	0.69	2.20	5.00
Q12	Behavioral consistency	3.88	0.73	2.10	5.00
Q13	Technical competency	4.10	0.67	2.50	5.00
Q14	Overall talent index	4.18	0.62	2.90	5.00

The table 3 shows descriptive statistics for all neuro-psychometric and competency-related variables used as part of the study. The results show that most attributes have relatively high mean scores indicating that employees generally possess positive work-related characteristics and are highly engaged. Moderate standard deviations demonstrate how much variability exists for each attribute when evaluating individual employee competencies and suggest that personalized, AI-supported talent management is needed to provide the best opportunity for employees to succeed.

### **4.3 Data Analysis**

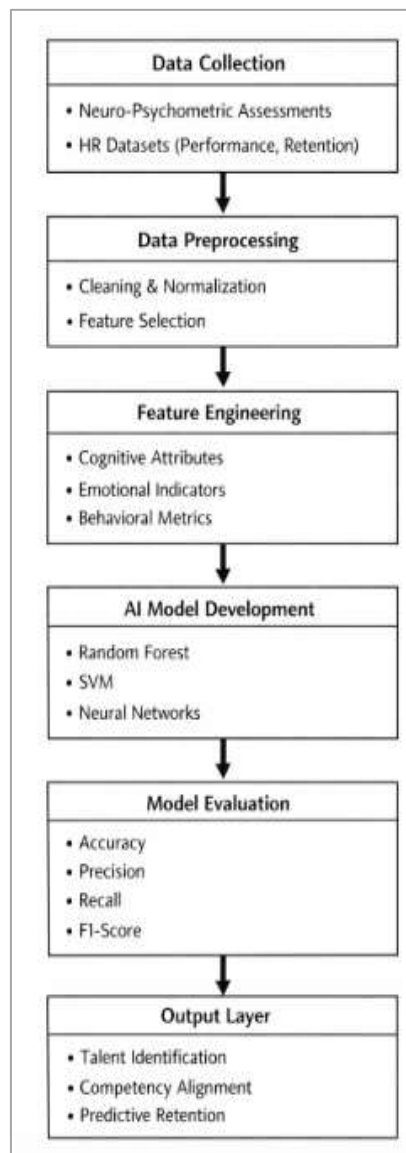
This research involves utilizing statistical and machine learning techniques. A summary of the overall data (descriptive statistics) will be created, correlations and regressions will show how different attributes relate to one another, and then to predict employees' performance and retention in the organization, we will use tools such as random forests, support vector machines (SVM), and neural networks. In addition, the researchers will do feature selection analyses to determine the most important neuro-psychometric variables with respect to each dependent variable for the future hiring process. The models will be assessed using the following performance measures: accuracy, precision, recall, and F1-score.

### **4.4 Ethical Considerations**

This research project strictly adheres to ethical guidelines throughout both the collection and analysis phases of data. Consent from each participant is obtained before any data will be collected about him/her, and any personal information will remain confidential. Data collected from each participant will be anonymised to protect their identity; results will only be used for research purposes. Further, the project has addressed a number of ethical considerations associated with the use of AI; for example: transparency, fairness, and minimising the impact of algorithmic bias when making decisions.

### **4.5 Integration of Findings**

The results from both Statistical and AI-based analyses will be combined to create one comprehensive framework of Talent Intelligence. Neuro-psychometric insights, combined with Predictive Analytics, will provide actionable recommendations for competency alignment and employee retention. The result will be a streamlined organisation view of employee Capability, Potential, and Performance to facilitate data-driven HR decision-making.



**Figure. 3. Methodological Workflow of the Neuro-Psychometric Talent Intelligence Framework**

As figure 3 illustrates, there is a sequential methodology to integrate all neuropsychometric data with artificial intelligence-based analysis methods through an iterative process of data collection, data preprocessing, model development, and model evaluation. The integration of all data types will allow for systematic identification of talent through competency alignment and predictive retention analysis, using a methodical and data-driven approach.

## 5. ANALYSIS AND FINDINGS

### 5.1 Unveiling Insights through Neuro-Psychometric and HR Data Analysis: A Comprehensive Exploration

#### 5.1.1 Dataset Diversity and Multi-Source Integration

Multiple data sources (Neuro-psychoeducational assessments, Human Resource performance data, and Employee Engagement statistics) comprise the dataset and represent a cross-section of employee profiles that include job groups, experience level, and functional domain. The diversity of the participant pool increases the ability to perform the analysis and provides that results will generalize across the environment in which they are applied.

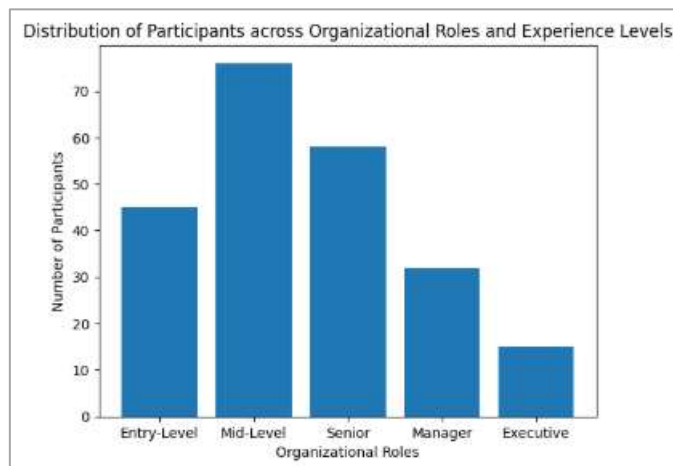
**Table 4: Relationship Between Neuro-Psychometric Attributes and Competency-Related Indicators (Q1–Q14)**

Variables	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14
<b>Cognitive Ability</b>	0.72	0.75	0.78	0.60	0.55	0.68	0.70	0.74	0.66	0.62	0.69	0.65	0.73	0.76
<b>Emotional Intelligence</b>	0.58	0.60	0.63	0.81	0.77	0.70	0.72	0.68	0.75	0.69	0.66	0.71	0.64	0.73
<b>Behavioral Traits</b>	0.61	0.64	0.67	0.72	0.69	0.78	0.74	0.76	0.80	0.73	0.71	0.75	0.70	0.79
<b>Learning Agility</b>	0.69	0.72	0.81	0.65	0.60	0.73	0.75	0.79	0.71	0.68	0.74	0.70	0.77	0.82
<b>Motivation &amp; Engagement</b>	0.65	0.68	0.70	0.74	0.72	0.76	0.78	0.75	0.83	0.71	0.73	0.77	0.72	0.80

Table 4 shows correlations between neuro-psychometric attributes and measures of competency (related). Strong positive correlation values between many of the variables indicates the positive effect cognitive, emotional and behavioural factors have on the development of competency. These results support the inclusion of neuro-psychometric attributes within AI-based talent intelligence models.

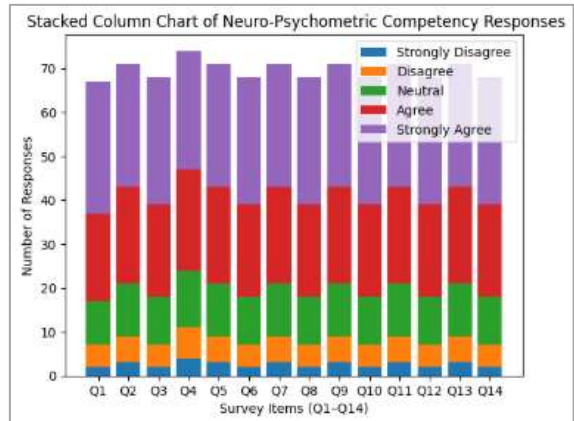
**5.1.2 Analysing Correlations: Patterns and Relationships**

The results of correlation analyses show that there are several relationships between employee outcomes and neuro-psychometric attributes. The performance variable was significantly related to both cognitive ability and learning agility in terms of the strength of the correlation; the same was found for Emotional Intelligence (EI) with engagement and retention. Adaptability and Motivation as behavioural traits were also shown to have significant relationships with Competency Alignment.



**Figure 4. Distribution of Participants Across Organizational Roles and Experience Levels**

Figure 4 shows the distribution of participants based on their organizational roles and experience levels. Most of the participants were in mid-level or senior positions, indicating that these experienced employees are significant to the field of talent analytics. The differences in the distribution of the participants also indicate the importance of tailoring competency alignment and predictive retention strategies specific to the functional roles.

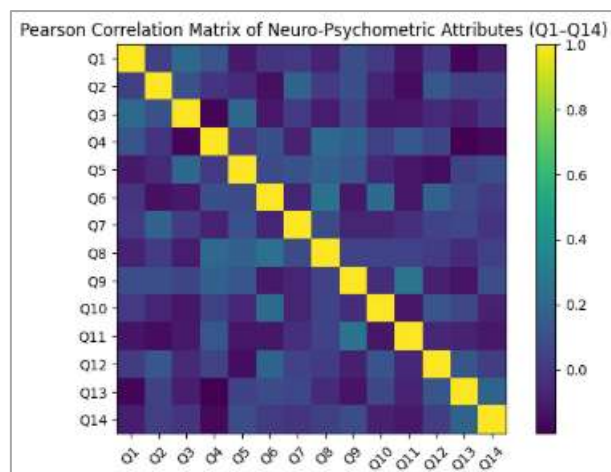


**Figure 5. A Stacked Column Chart Illustrating Responses to Neuro-Psychometric Competency Indicators Across Survey Items (Q1–Q14)**

Participant's perceptions regarding neuro-psychometric competency indicators are reported using a Likert scale format in figure 5. As evident from the results, the majority of participants fall within the categories of 'agree' or 'strongly agree' with respect to their own levels of competency, thus demonstrating strong levels of competence. The differing response distributions reveal the cognitive, emotional and behavioral differences that exist among employees, indicating that these factors must be addressed when considering talent analytics.

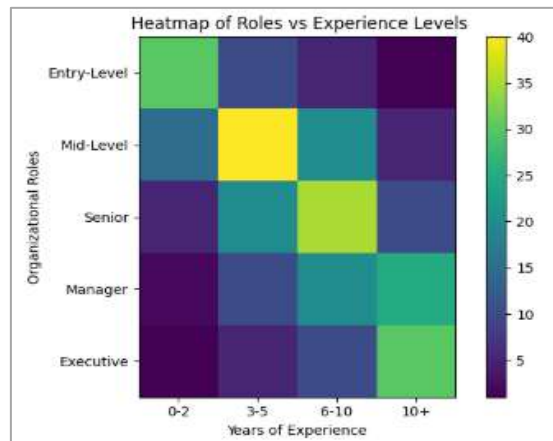
### 5.1.3 Diving Deeper: Insights from AI-Based Analysis

The application of machine learning model analytics provides more insight into the importance of the various attributes measured by previous survey research or data collection processes. Feature importance analysis indicated that cognitive ability, emotional intelligence, and level of engagement are three important predictors of performance and retention. In addition, the models uncover hidden patterns in behaviour such as the combined effect of consistent behaviours and motivation on later employee stability.



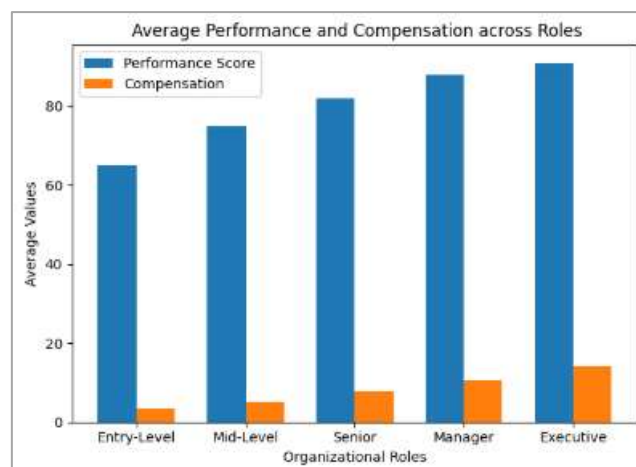
**Figure 6. Pearson Correlation Matrix of Neuro-Psychometric Attributes and Competency Indicators (Q1–Q14)**

Pearson's coefficient is presented in figure 6 to show the relationship between neuro-psychometric variables and competency indicators. Strong correlations can be found between cognitive, emotional and behavioural attributes which contribute to an employee's competency level. The correlation matrix shows the patterns of these variables that validate the use of AI-based modelling for the purpose of identifying talent and predicting retention.



**Figure. 7. Heatmap Illustrating the Relationship Between Organizational Roles and Years of Experience in The Current Position**

The heatmap represented by this illustration (Figure 7) shows how the employees are clustered in relation to their organizational roles and the length of time they have been on the job. The information in the heat map reflects that mid and senior level employees have most of their experience in the range of moderate or moderate-high. Managerial or executive employees have most of their experience with an “experience level” at the high end. This indicates an ongoing development of competencies through the employee's career and supports the use of an experience-based talent alignment strategy.



**Figure. 8. Average Performance and Compensation Levels Across Organizational Roles and Competency Segments**

This chart (Figure 8) shows how employee performance compares to the level of pay in different types of jobs within a company. It appears as though employees will have higher scores on their performance evaluations as they move into higher-level positions. In addition, there also seems to be a direct correlation between the number of competencies developed, to the performance evaluation score and the amount of pay received from the employer.

#### 5.1.4 Performance, Engagement, and Career Progression

Based on the analysis done, it appears there is a correlation between an employee's neuro-psychometric ability and their work performance and rate of advancement in their chosen career. Engagement has a mediating effect by acting as an intermediate state between the employee's psychological characteristics and the organizational outcome. An employee with high levels of emotional intelligence and the ability to adapt will tend to receive higher performance ratings and progress more quickly within the organization.

**5.1.5 Workforce Segmentation: High-Potential vs. At-Risk Employees**

Talent management strategies use AI clustering to create segments of employees as high-potential, stable performers, or at-risk. High-potential employees will have cognitive and emotional strengths, while at-risk employees tend to be less engaged or show greater variability in their behaviour patterns. This segmentation is essential for implementing appropriate talent management strategies.

**5.2 Expert Insights on Neuro-Psychometric Attributes and Talent Identification****5.2.1 Harnessing the Power of Semi-Structured Interviews**

To validate the significance of neuropsychometric characteristics, HR staff, management specialists, and industry authorities will participate in semi-structured interviews. The interviews will highlight the ways in which businesses evaluate and identify their workforce in terms of importance.

**5.2.2 Validation of the Interview Framework**

The expert review validates the interview framework, so that the cognitive ability, emotional intelligence and behaviours attribute are established and applicable for real-world use by HR professionals. As such, this validation increases the expected reliability of the proposed model.

**Table 5: Profile of Industry Experts: Professional Roles and Experience in Neuro-Psychometric and AI-Driven HR Analytics**

Expert ID	Professional Role	Industry Domain	Years of Experience	Area of Expertise
E1	HR Director	IT Services	18	Talent Management, Workforce Analytics
E2	Organizational Psychologist	Consulting	15	Psychometric Assessment, Behavioral Analysis
E3	Data Scientist (HR Analytics)	Technology	12	Machine Learning, Predictive Analytics
E4	Talent Acquisition Lead	Manufacturing	10	Recruitment Analytics, Skill Mapping
E5	HR Business Partner	Finance	14	Employee Engagement, Performance Management
E6	AI Specialist (People Analytics)	Tech Startup	9	AI Models, Talent Intelligence Systems
E7	Learning & Development Head	Education	16	Competency Development, Training Systems
E8	Organizational Behavior Expert	Research/Academia	20	Behavioral Modeling, Leadership Studies

Table 5 details the professional profiles of the experts that participated in this study, including their responsibilities, years of experience, and areas of expertise. This diversity of backgrounds provides a strong foundation for an extensive approach to providing information regarding neuro-psychometrics (theoretical constructs), and AI based talent analytics (practical outcomes). The extent of this diversity enhances both the validity and application of the qualitative results produced in this study.

### 5.2.3 Insights from Industry Experts

Experts have stated that the combination of psychological evaluation and AI analytical support will be next generation. The experts believe established performance metrics do not measure potential for success in a systematic way or how effective a potential employee could be in the first place. There is a strong need for talent intelligence systems that are dynamic, data driven, and explainable in nature.

### 5.3 Mixed Data Integration

A comprehensive understanding of talent intelligence was achieved by combining AI-based quantitative data with qualitative data from expert interviews as part of a dual approach (mixed-methods). The study provides statistical and practical information on talent intelligence through the combination of qualitative and quantitative methods. The combined results confirm that the neuro-psychometric framework will improve the alignment of competencies and the predictability of retention.

## 6. DISCUSSION

According to this study, three neuropsychometric characteristics (cognitive ability, emotional intelligence, and behavior traits) are some of the most significant aspects related to employee performance and retention. AI can provide accurate predictions and identify hidden relationships in large amounts of data; therefore, AI models can be used to identify high-potential employees and improve workforce planning. The results of the study emphasize the importance of ongoing competency alignment and the development of ethical, data-driven HR systems. Finally, the integration of AI and psychometric data into the talent management decision-making process adds significant value to the overall decision-making process.

## 7. CONCLUSION

The Neuro-Psychometric Talent Intelligence Framework, which was developed using both Psychological Assessments and AI Analytics, aims to provide more effective competency alignment, more relevant performance evaluation and more accurate predictions of retention. The model contributes to both theory and practice by linking Human Resource Management (HRM) and Artificial Intelligence (AI). Overall, this framework will support more effective and data-driven Talent Management in today's organizations.

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