Application of Neuro-Coaching Model in Esfahan Steel Company

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Abstract

The present study aimed to apply the neuro-coaching model in Esfahan Steel Company. This research is applied in terms of its objective and belongs to the category of qualitative grounded theory studies of an exploratory nature, conducted in two phases. In the first phase, after reviewing the literature, 15 in-depth and semi-structured interviews were conducted using theoretical purposive sampling (including experts from Islamic Azad Universities and managers of Esfahan Steel Company). Data were gathered until theoretical saturation was reached. To analyze the data collected from the interviews, the systematic approach of Strauss and Corbin was implemented, and the analysis was carried out in three stages: open, axial, and selective coding. At the end, a summary of the formulated model was presented to four professors, and their feedback was collected for revision and adjustment. To ensure the reliability of the data, the criteria of grounded theory, including understandability, fit, controllability, and generalizability, as proposed by Strauss and Corbin (2008), were carefully examined. In the next phase, using confirmatory factor analysis, the axial, causal, contextual, intervening conditions, strategies, and outcomes were examined. Finally, consensus was reached on 209 open codes and 40 selective codes. Structural equation modeling and partial least squares (PLS) with Smart PLS software were used for modeling. The research findings indicated that the neuro-coaching model in Esfahan Steel Company is based on 8 causal conditions, 8 contextual conditions, 6 intervening factors, and 7 strategies. Ultimately, 11 major outcomes were identified for Esfahan Steel Company, which include: improvement of neural processes, personal growth and development, empowerment and psychological improvement, enhancement of interactions and satisfaction, performance improvement and cost reduction, psychology and personal relationships, interactions and communications, personal and psychological growth, personal and professional development, interactions and practices, and the quality and effectiveness of neural solutions.

Keywords: *neuro-coaching, neuroscience, modeling, Esfahan Steel Company.*

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1. Introduction

Neuro-coaching is a method that assists individuals in improving organizational and personal performance. This method is based on a combination of neuroscience and psychology, utilizing scientific principles to enhance individual performance, change harmful behavioral patterns, and strengthen personal skills and capabilities. In fact, neuro-coaching helps individuals achieve their goals and become the best versions of themselves by altering their thought processes and brain functions [1-3].

Organizational coaching focuses on system changes within a company and strives to bring it to an optimal point. The focus of coaching is on improving the performance of every element of the organization, particularly human resources. By integrating neuroscience into organizations, the combination of coaching and neuroscience, known as neuro-coaching, has gained a significant position in organizations. Coaches can use neuro-coaching techniques to identify blind spots within the organization that might otherwise go unnoticed. The ultimate goal is the overall growth of the organization, encompassing individual and organizational empowerment, crisis management, new perspectives, and development. Initially, when coaching entered organizations, businesses generally sought coaches when they noticed deficiencies within their systems [4-6]. However, the perspective on coaching has changed today. Organizations now seek organizational coaching not just to address shortcomings but also in search of further development [7-10]. The current motivations for utilizing organizational coaching include achieving new goals, fostering more dynamism, preparing individuals for more effective functioning, and creating a psychologically safer environment for employees to share their opinions [8, 11-13]. With this change in perspective, coaching is no longer seen as a sign of weakness but rather as a badge of honor for organizations, indicating their desire for growth and further development. In today's business world, the use of organizational coaching and neuroscience in this context is one of the signs that a business is worth investing in [7].

Several studies have explored coaching in the context of employee and managerial performance. For example, Sangari and Pourvali (2014) designed a structural equation model of managerial coaching behavior and its related outcomes on job performance [14]; Kiani and colleagues (2022) explored the managers' obstructive beliefs in improving organizational behavior and the role of coaching in rebuilding it [6]; Dehghani Ashkezari (2022) examined the role of coaching in empowering human resources in governmental organizations [8]; Ahmadi and colleagues (2022) studied the social factors influencing the application of employee performance coaching in Iranian governmental organizations [10]; Dastgerdi and colleagues (2021) designed an organizational coaching model in Iranian governmental organizations using a grounded theory approach [12]; Hosseini (2021) explored the impact of managerial coaching on employees' altruism and conscientiousness [11]; Sadegh and colleagues (2021) studied the role of project manager coaching skills in gaining feedback from interactive communication with project stakeholders [15]; Shadmand (2021) investigated the role of operational manager coaching in the wood industry companies on the education and motivation of human resources [16]; Amiri and Amin (2020) conducted a systematic review of studies on organizational coaching in Iran [17]; Bayati and colleagues (2020) examined the role of coaching in businesses [18]; Nazari and Attar Zadeh (2018) evaluated coaching indicators and skills in commercial organizations for the enhancement of organizational strategic planning [19].

Researchers abroad have also studied coaching. For instance, Koopman and colleagues (2021) examined the temporal development of coaching and mentoring [20]; Hilali and colleagues (2020) explored coaching and mentoring; Bernardin and colleagues (2017) studied human resource management and a new approach to coaching [21].

As demonstrated, the literature on coaching is relatively extensive, with researchers studying various aspects of it. However, what is noticeably lacking is the focus on neuroscience and neuro-coaching. The study of neuro-coaching, its dimensions, understanding, applications, importance of implementation, influential factors, strategies, and outcomes has not been fully addressed. To date, no comprehensive domestic study has been conducted in this area, and international research in recent years shows that the current study offers innovation and advantages while highlighting gaps in previous research. Thus, it is necessary and important to conduct such a study.

Furthermore, this research will be implemented in Esfahan Steel Company, and its results will be practically and operationally applied within the organization. Some of the practical applications that the managers and officials of Esfahan Steel Company can benefit from include: by formulating this model, the managers will understand neuro-coaching and its related components, recognize the importance of its application, and use neuro-coaching

techniques to develop the best and most efficient human resource strategies and make optimal decisions in this field. These strategies can then be applied to implement human resource development policies such as training and empowering managers and employees. With a deeper understanding of employee behavior and decision-making, they can provide solutions for improving workplace relationships, increasing participation and interaction among team members, and enhancing employee performance and stakeholder engagement. Additionally, by using neuro-coaching techniques, the managers of Esfahan Steel Company can make suitable improvements in their strategic decision-making processes, and with a deeper understanding of the influence of cognitive and psychological factors on decision-making, they can propose more appropriate strategies for the organization's growth and development. Overall, managers in every department of Esfahan Steel Company can utilize neuro-coaching to enhance both their performance and that of their employees, achieve better strategies, and ultimately increase profits, reduce costs, enhance competitive advantage, market share, and create added value, leading to human resource excellence and productivity.

2. Methodology

The present study is applied in nature, as its objective is to design and explain the neuro-coaching model in Esfahan Steel Company. In terms of execution, it falls under the category of qualitative grounded theory research and is exploratory in nature. The statistical population of this study consists of two sections. The first group of participants includes experts from Islamic Azad Universities and managers of Esfahan Steel Company. A total of 15 individuals were purposefully selected, and interviews were conducted with participants who met at least one of the following criteria: 1) familiarity with the concept of neuro-coaching and prior studies in this area, 2) being managers at Esfahan Steel Company or faculty members of the university holding executive positions at Islamic Azad University.

The second group of participants in this study consisted of a number of Esfahan Steel Company officials, with a sample size of 384 individuals. After collecting and simultaneously analyzing the qualitative data, the results were conceptualized as a neuro-coaching model for Esfahan Steel Company based on the Strauss and Corbin paradigm model. Subsequently, a questionnaire was developed based on the proposed model to examine the relationships between the model variables using quantitative data, with the aim of identifying the most suitable model for neuro-coaching. The validity and reliability of the prepared questionnaire were first assessed, and after ensuring its credibility, the proposed model was evaluated, and its fit indices were calculated.

The statistical population in the quantitative section of this study consists of Esfahan Steel Company officials. To determine the sample size for the quantitative section, the formula for sampling an infinite population was used. Based on this formula, a sample size of 384 individuals was determined.

3. Findings and Results

In response to the research question (What is the proposed neuro-coaching model for Esfahan Steel Company?), the qualitative data gathered from the process of conducting semi-structured interviews with research participants (university experts and key informants) were analyzed through open, axial, and selective coding. A summary of the findings from the three stages of coding is presented in Table 1.

Table 1. Dimensions and Components Derived from the Three Coding Stages

Dimensions	Items
Causal Conditions	• Management and organization • Rational decision-making • Neuro-coaching process • Budget and taxation • Evaluation and support • Expertise and skills • Resource management • Neural culture in the organization
Contextual Conditions	• Collaboration and coordination • Customer orientation and knowledge update • Neural management and efficiency • Mindfulness and mastery of cognitive skills • Combination of methods and principles • Psychological interpersonal relationships • Organizational budgeting • Social and behavioral communication based on neuroscience
Strategies	• Neuroscience-based planning and goal-setting • Neuro-coaching skills • Neural education and empowerment • Support and conflict reduction • Use of neuroscience in management and scheduling • Behavioral analysis and feedback • Utilization of neural methods
Central Phenomenon	The importance and implementation of neuro-coaching

Intervening Conditions	• Ethical principles • Professional development • Cognitive enhancement • Principle-based consulting grounded in neuro-coaching approaches • Neural focus • Collaboration and interaction • Application of technology
Outcomes	• Improvement of neural processes • Personal growth and development • Empowerment and psychological improvement • Improvement of interactions and satisfaction • Performance improvement and cost reduction • Psychology and personal relationships • Interaction and communication • Personal and psychological growth • Personal and professional development • Interactions and practices • Quality and effectiveness of neural solutions

Figure 1. Final Model of The Study
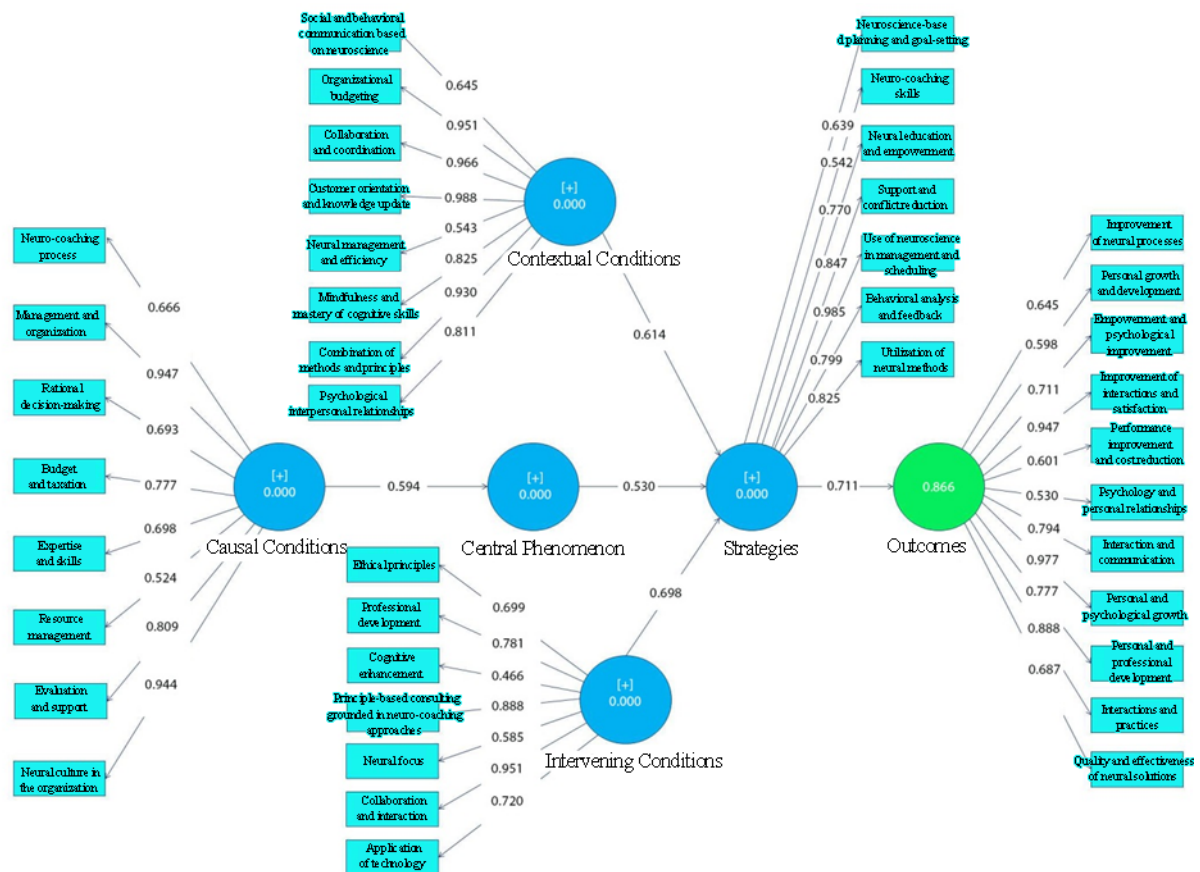
To extract the axial coding paradigm findings regarding the discovery of the core category, which forms the foundation of the paradigm model and organizes other elements around it, data were collected through semi-structured interviews with 15 key informants. To ensure that the research topic was monitored within knowledge-based companies in the field of information technology, 14 questions were included in interviews with several experts from Islamic Azad Universities and Esfahan Steel Company managers. This was done in accordance with the validity of the subject and the research objective, which was to explain the neuro-coaching model in Esfahan Steel Company.

During the information gathering process, concepts and statements related to the topic gradually accumulated, and by the tenth interview, the statements had been summarized, leading to the discovery of the core category: the importance

and implementation of neuro-coaching. Afterward, subsequent questions were formulated around this core category, and by the twelfth interview, theoretical saturation was largely achieved. However, to ensure this and fill the conceptual gaps in the model, the interviews continued until the fifteenth one.

Finally, the categories were organized into 40 core categories within the six dimensions of the paradigm model, consisting of 8 causal conditions, 8 contextual conditions, 6 intervening factors, and 7 strategies, with 11 major outcomes identified. The relationships between them were illustrated in the paradigm model, and the details are presented in Figure 1.

To examine the neuro-coaching model, structural equation modeling (SEM) and partial least squares (PLS) methods were used, and the research model was finally

depicted as in Chart 4-65. In this model, it was determined that causal conditions, with a factor loading of (0.594), had an impact on the central phenomenon. Intervening factors, with a factor loading of (0.698), and contextual conditions, with a factor loading of (0.614), along with the central phenomenon, with a factor loading of (0.530), influenced the strategies. Moreover, strategies, with a factor loading of (0.711), affected the outcomes.

As mentioned earlier, the quantitative model was fitted using structural equation modeling, and various methods such as validity and reliability testing were used to evaluate the model's components and factors. Based on the findings, it can be concluded that the research model generally has relatively good internal consistency. Comprehensive criteria and methods were used to assess both the validity and reliability of the tools. Three types of validity indicators—internal consistency, item validity, and discriminant validity—were calculated in two stages of the research. In the findings section, it was concluded that the model's validity in all three aspects was appropriate. Cronbach's alpha coefficients increased, and the composite reliability was estimated to be appropriate. Finally, model fit indices, such as R2 and the Goodness of Fit Index (GOF) (0.725), demonstrated that the fitted model had strong and appropriate fit, confirming the reliability of the research findings.

4. Discussion and Conclusion

The present study, given its objective of designing a qualitative neuro-coaching model for Esfahan Steel Company, falls within the realm of applied research. In this study, experts and senior specialists in the relevant field were included in the interviews. In the first phase of the study, during the qualitative phase, the dimensions (selective codes) and subcategories (axial codes) were identified and extracted using the grounded theory approach, focusing on the factors influencing the implementation of neuro-coaching in Esfahan Steel Company. As previously mentioned, to explore the dimensions, criteria, and sub-criteria for modeling, the grounded theory method was used, and the results were obtained in six sections as follows:

What are the central conditions of neuro-coaching (neuroscience coaching) in Esfahan Steel Company?

For this purpose, interviews were conducted and then coded using the grounded theory method. After the final summarization and confirmatory factor analysis, these factors were categorized, and the results showed that the type of neuro-coaching and the significance of neuro-coaching are considered central conditions in Esfahan Steel Company.

What are the causal conditions of neuro-coaching (neuroscience coaching) in Esfahan Steel Company?

Interviews were conducted and coded using the grounded theory method, and after the final summarization and confirmatory factor analysis, these factors were categorized. The results revealed that out of 8 axial codes and 59 open codes, after confirmatory factor analysis, 8 axial codes and 50 open codes were finalized, and 9 sub-criteria with a factor loading of less than 0.4 were removed. The main factors, ranked by priority and factor loading, are as follows: management and organization (0.947), neural culture in the organization (0.944), evaluation and support (0.809), budget and taxation (0.777), expertise and skills (0.698), rational decision-making (0.693), the neuro-coaching process (0.666), and resource management (0.594), which ranked last.

What are the contextual conditions of neuro-coaching (neuroscience coaching) in Esfahan Steel Company?

Interviews were conducted and coded using the grounded theory method, and after the final summarization and confirmatory factor analysis, these factors were categorized. The results showed that out of 8 axial codes and 46 open codes, after confirmatory factor analysis, 8 axial codes and 42 open codes were finalized. The main factors, ranked by priority and factor loading, are as follows: customer orientation and knowledge update (0.988), collaboration and coordination (0.966), organizational budgeting (0.951), combination of methods and principles (0.930), mindfulness and mastery of cognitive skills (0.825), psychological interpersonal relationships (0.811), social and behavioral communication based on neuroscience (0.645), and neural management and efficiency (0.543), which ranked last.

What are the strategies of neuro-coaching (neuroscience coaching) in Esfahan Steel Company?

Interviews were conducted and coded using the grounded theory method, and after the final summarization and confirmatory factor analysis, these factors were categorized. The results showed that out of 7 axial codes and 31 open codes, after confirmatory factor analysis, 7 axial codes and 28 open codes were finalized. The main strategies, ranked by priority and factor loading, are as follows: use of neuroscience in management and scheduling (0.985), support and conflict reduction (0.847), utilization of neural methods (0.825), behavioral analysis and feedback (0.799), neural education and empowerment (0.770), neuroscience-

based planning and goal-setting (0.693), and neuro-coaching skills (0.542), which ranked last.

What are the intervening conditions of neuro-coaching (neuroscience coaching) in Esfahan Steel Company?

Interviews were conducted and coded using the grounded theory method, and after the final summarization and confirmatory factor analysis, these factors were categorized. The results showed that out of 7 axial codes and 26 open codes, after confirmatory factor analysis, 7 axial codes and 24 open codes were finalized. The main intervening conditions, ranked by priority and factor loading, are as follows: collaboration and interaction (0.951), principle-based consulting grounded in neuro-coaching (0.888), professional development (0.781), technology application (0.720), ethical principles (0.699), neural focus (0.585), and cognitive enhancement (0.466), which ranked last.

What are the outcomes of neuro-coaching (neuroscience coaching) in Esfahan Steel Company?

Interviews were conducted and coded using the grounded theory method, and after the final summarization and confirmatory factor analysis, these factors were categorized. The results showed that out of 11 axial codes and 89 open codes, after confirmatory factor analysis, 11 axial codes and 69 open codes were finalized. The main outcomes, ranked by priority and factor loading, are as follows: personal and psychological growth (0.977), improvement in interactions and satisfaction (0.947), interactions and practices (0.888), interactions and communication (0.794), professional development (0.777), empowerment and psychological improvement (0.711), quality and effectiveness of neural solutions (0.687), improvement of neural processes (0.645), performance improvement and cost reduction (0.601), personal growth and development (0.598), psychology and personal relationships (0.530).

Based on the research findings, the following suggestions are provided to the managers and officials of Esfahan Steel Company:

1. **Demand forecasting**: By using neuro-coaching algorithms, they can forecast steel product demand based on various factors such as metal prices and economic variables. This information will help the company optimize production planning, reduce costs, and improve production performance.

2. **Process optimization**: Using neuro-coaching algorithms, they can optimize production processes. These algorithms can improve efficiency and reduce losses in various processes, including melting, casting, and steel processing.

3. **Quality control**: With neuro-coaching, they can create models to predict product quality. These models analyze inputs such as temperature, speed, and pressure to control the production process, thereby minimizing defective products and material returns.

4. **Production time optimization**: Using neuro-coaching algorithms, they can optimize production time. These algorithms analyze various data, such as production history, machine speeds, and process settings, to reduce the time required to produce each product and improve production performance.

5. **Predicting errors and failures**: Neuro-coaching can help predict potential errors and failures in production processes. By analyzing maintenance and repair data for machinery, they can build models to help the company detect failures before they occur and take preventive actions.

Implementing neuro-coaching requires a skilled technical team and strong technical knowledge.

Overall, to design and implement neuro-coaching at Esfahan Steel Company, it is recommended that managers and officials follow these steps:

1. **Data collection**: First, they need to collect data related to production processes, quality control, and other relevant areas. This data may include information such as temperature, pressure, speed, machine settings, and product quality data.

2. **Data preprocessing**: The collected data needs to be preprocessed to be ready for use in neuro-coaching models. This step involves handling outliers, standardizing data, converting formats, and selecting appropriate features.

3. **Building the neuro-coaching model**: After data preprocessing, they need to design and build the neuro-coaching model. This model may include deep neural networks, recurrent neural networks, or convolutional neural networks. The model should be designed based on the company's needs and data characteristics.

4. **Model training**: To train the neuro-coaching model, they should use the collected data. This step involves splitting the data into training and evaluation sets, selecting a cost function, determining the optimization algorithm, and setting model parameters.

5. **Model evaluation and optimization**: After training the model, they should test it on evaluation data to assess its performance. If necessary, they can improve the model by adjusting parameters and structure.

6. **Model implementation and execution**: Once the model is trained and optimized, they should implement and execute it in the production environment.

Authors' Contributions

Authors equally contributed to this article.

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

All procedures performed in this study were under the ethical standards.

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