

الجمهورية الجزائرية الديمقراطية الشعبية
République Algérienne Démocratique et Populaire

Ministère de l'Enseignement Supérieur
et de la Recherche Scientifique
Ecole Nationale Supérieure de Management
Koléa



وزارة التعليم العالي و البحث العلمي
المدرسة الوطنية العليا للمناجنت
القلعة

**A Dissertation Submitted in Partial Fulfilment of the Requirements for the
Degree of Master in Human Resource Management**

The Impact of Competency Evaluation on the Effectiveness of Training Systems

Case : SONATRACH TRC ALGIERS

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Academic Year : 2025/2026

ABSTRACT :

This study examines the impact of competency evaluation on the effectiveness of training systems at SONATRACH - Pipeline Transportation Activity (TRC) in Algiers, through four main dimensions: the evaluation process, evaluation criteria, evaluation methods and tools, and the related constraints. A quantitative approach was adopted based on data collected from 135 employees through a structured questionnaire and analyzed using multiple linear regression.

The results demonstrated that competency evaluation positively affects the effectiveness of the training system. However, the field study revealed the complete absence of any formal competency evaluation system within the company, which led to a mismatch between training content and the actual job requirements. The study concludes that establishing organized competency evaluation practices is an essential condition for improving training quality and organizational performance.

Keywords : Competency Evaluation, Evaluation Process, Evaluation Methods and Tools, Training System Effectiveness, Human Resource Management.

RESUMÉ :

Cette étude examine l'impact de l'évaluation des compétences sur l'efficacité des systèmes de formation au sein de SONATRACH - Activité Transport par Canalisations (TRC)Alger , à travers quatre dimensions principales : le processus d'évaluation, les critères d'évaluation, les méthodes et outils d'évaluation, ainsi que les contraintes qui y sont liées. Une approche quantitative a été adoptée sur la base de données collectées auprès de 135 employés à l'aide d'un questionnaire structuré, puis analysées par régression linéaire multiple.

Les résultats ont démontré que l'évaluation des compétences influence positivement l'efficacité du système de formation. Cependant, l'étude de terrain a révélé l'absence totale d'un système formel d'évaluation des compétences au sein de l'entreprise, ce qui a conduit à une inadéquation entre le contenu des formations et les exigences réelles des postes. L'étude conclut que la mise en place de pratiques organisées d'évaluation des compétences constitue une condition essentielle pour améliorer la qualité de la formation et la performance organisationnelle

Mots-clés : évaluation des compétences, processus d'évaluation, critères d'évaluation, méthodes et outils d'évaluation, efficacité du système de formation.

ملخص :

تتناول هذه الدراسة أثر تقييم الكفاءات على فعالية أنظمة التكوين في مؤسسة سوناطراك — نشاط نقل المحروقات عبر الأنابيب (TRC) بالجزائر، من خلال أربعة أبعاد رئيسية: عملية التقييم، معايير التقييم، أساليب وأدوات التقييم، والقيود المرتبطة به. اعتمد المنهج الكمي بالاستناد إلى بيانات جمعت من 135 موظفًا عبر استبيان منظم، وحُللت باستخدام الانحدار الخطي المتعدد.

أثبتت النتائج أن تقييم الكفاءات يؤثر إيجابيًا على فعالية نظام التكوين. غير أن الدراسة الميدانية كشفت عن غياب تام لأي نظام رسمي لتقييم الكفاءات داخل المؤسسة، مما أفضى إلى عدم توافق بين مضامين التكوين ومتطلبات المناصب الفعلية. وتخلص الدراسة إلى أن إرساء ممارسات منظمة في تقييم الكفاءات يُعدّ شرطاً أساسياً لتحسين جودة التكوين والأداء المؤسسي.

الكلمات المفتاحية: تقييم الكفاءات، عملية التقييم، معايير التقييم، أساليب وأدوات التقييم ، فعالية نظام التكوين .

ACKNOWLEDGMENTS :

First and foremost, all praise and gratitude are due to Allah Almighty, who gave us the strength, patience, and courage to complete this humble work. Without His blessings and guidance, this achievement would not have been possible.

We dedicate this work with deep love and gratitude to our beloved parents, whose endless sacrifices, unconditional support, prayers, and encouragement have always been the source of our motivation and success. May Allah protect them and reward them abundantly.

Our sincere and special thanks go to our respected supervisor, LEB CIR Islam , for his valuable guidance, continuous support, patience, and precious advice throughout the realization of this research.

We would also like to express our deepest gratitude to our supervisors within the organization, BENMOUHOU Hayat and SAIDANI Massinissa , for their assistance, encouragement, and professional orientation, which greatly contributed to the completion of this work.

A heartfelt acknowledgment is extended to all the professors of our school and to the entire administrative and educational staff for their efforts, dedication, and the quality of education and support they provided throughout our academic journey.

Finally, we dedicate this achievement to our families, friends, and everyone who supported us directly or indirectly, hoping that this work will be a source of pride and a step toward a brighter future.

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LIST OF ABBREVIATIONS :

HR : Human Resources

HRM : Human Resource Management

HRIS : Human Resource Information Systems

LMS : Learning Management Systems

CBT : Competency-Based Training

TNA : Training Needs Analysis

CIPP : Context, Input, Process, Product

CIRO : Context, Input, Reaction, Outcome

SEM : Structural Equation Modeling

AFEST : Action de Formation en Situation de Travail

SPA : Société Par Actions

LNG : Liquefied Natural Gas

LPG : Liquefied Petroleum Gas

HSE : Health, Safety and Environment

SCADA : Supervisory Control and Data Acquisition

TRC : Transport par Canalisations

STC : Système de Transport par Canalisations

CPF : Compte Personnel de Formation

VAE : Validation des Acquis de l'Expérience

NSSBI : National Skill Standards Board Institute

PTS : Pipeline Transport Systems

ROI : Return on Investment

VIF : Variance Inflation Factor

CEO : Chief Executive Officer

GENERAL INTRODUCTION

« Competence is not a state or possessed knowledge; it cannot be reduced to knowing or knowing how to do » (Boterf, 2011)

Training systems are among the most prominent investments to which modern organizations devote increasing attention, stemming from their recognition that developing the competencies of their human resources represents a fundamental condition for achieving organizational effectiveness. As (Aguinis & Kraiger, 2009) emphasize, training contributes directly to improving the performance of individuals, teams, and organizations alike. However, the effectiveness of these systems is not guaranteed merely by their design and implementation, as (Noe, 2020) asserts that training systems only achieve their objectives when they are grounded in an accurate diagnosis of the actual needs of the organization and its employees. It is in this context that competency evaluation emerges as a comprehensive and systematic process within human resource management, extending beyond the boundaries of any single function to serve decisions related to recruitment, promotion, and training alike (Armstrong, 2014). This process aims fundamentally at bridging the gap between available and required competencies, thereby ensuring that development systems are directed toward the genuine needs of the organization (Salas, Tannenbaum, Kraiger, & Smith-Jentsch, 2012).

Despite the recognized importance of competency evaluation in the scientific literature, the question remains as to the extent to which it actually influences the effectiveness of training systems within organizations. The absence of structured and objective evaluation practices may lead to training systems built upon assumptions far removed from reality, thereby diminishing their impact on individual and organizational performance. This issue is particularly pressing in the context of large Algerian organizations, where the need to establish competency evaluation practices and link them effectively to training systems remains considerable. (Kirkpatrick & Kirkpatrick, 2006) emphasized that evaluating training effectiveness requires the prior existence of clear and systematic criteria, which cannot be achieved in the absence of a structured competency evaluation process.

At the national level, Algeria has demonstrated a growing commitment to employee training and competency development through a series of legislative and regulatory texts. Order No. 06-03 of July 15, 2006, relating to the General Civil Service Statute, enshrined in its Article 38 the right of civil servants to training, professional development, and career advancement. Furthermore, Executive Decree No. 96-92 of March 3, 1996, obliged public institutions and administrations to prepare an annual training plan, while Executive Decree No. 20-194

specified the modalities for organizing training sessions, professional development courses, and knowledge renewal systems for public employees and agents. However, the existence of this legislative framework alone does not suffice to guarantee training effectiveness, as the question of competency evaluation prior to the design of training systems remains a persistent challenge in Algerian organizations. It is within this context that the present study situates itself, selecting SONATRACH TRC as its case for analysis.

Choice and Relevance of the Topic :

We have selected this topic due to its growing relevance in the field of human resource management, particularly in the context of Algerian organizations facing increasing demands for improved performance and continuous skills development. The effectiveness of training systems has become closely linked to the quality of competency evaluation practices, which play a key role in aligning human capital with organizational needs.

This research choice is also driven by the strategic importance of competency management in enhancing organizational efficiency, especially within large public enterprises such as SONATRACH, which represent a major pillar of the national economy.

Furthermore, the scarcity of empirical studies addressing the relationship between competency evaluation and training effectiveness in the Algerian context has motivated us to investigate this issue. The aim is to contribute to a deeper academic understanding of how competency evaluation can support the improvement of training systems and overall organizational performance.

Research Objective :

This study primarily aims to determine the extent to which competency evaluation influences the effectiveness of training systems within SONATRACH TRC in Algeria. It also seeks to highlight the mechanisms through which evaluation practices contribute to the improvement of training processes and outcomes. More specifically, the research aims to:

- Analyze current competency evaluation practices within the organization
- Understand the evaluation process and its level of formalization
- Examine the tools, methods, and criteria used in competency evaluation
- Identify the limitations and constraints affecting the effectiveness of the system
- Measure the overall contribution of competency evaluation to enhancing training system performance

Problem Statement and Research Question :

In this perspective, the objective of this study is to examine the impact of competency evaluation on the effectiveness of training systems within SONATRACH TRC in Algeria. This investigation is based on prior research by authors such as (Schweizer, 2024), (Bahiroh & Arthawati, 2025), (Chen, Zhang, & Li, 2022), and others, who have emphasized the importance of competency evaluation practices in ensuring human capital development and improving organizational performance. Building on their contributions, this research seeks to address the following central question:

To what extent does competency evaluation enhance the effectiveness of training systems within SONATRACH TRC in Algiers ?

To answer this question, the study focuses on four key dimensions of competency evaluation: the competency evaluation process, evaluation criteria, evaluation methods and tools, and the limitations of competency evaluation within SONATRACH TRC.

To further deepen the analysis, the study is structured around four specific sub-questions:

- **Q1:** Does the competency evaluation process influence the effectiveness of training systems?
- **Q2:** Do evaluation criteria have an effect on the effectiveness of training systems?
- **Q3:** Do evaluation methods and tools contribute to improving the effectiveness of training systems?
- **Q4:** Do the limitations of competency evaluation impact the effectiveness of training systems ?

Research Hypotheses :

Within the framework of this study, we propose several hypotheses aimed at exploring the impact of competency evaluation on the effectiveness of training systems within SONATRACH TRC in Algiers . These hypotheses are formulated based on previous research on competency evaluation and the development of training systems in organizations.

- **(H1):** Competency evaluation has a significant impact on the effectiveness of training systems within SONATRACH TRC in Algiers .
- **(H1a):** The competency evaluation process has a positive and significant impact on the effectiveness of training systems.

- **(H1b):** Evaluation criteria have a positive and significant impact on the effectiveness of training systems.
- **(H1c):** Evaluation methods and tools have a positive and significant impact on the effectiveness of training systems.
- **(H1d):** The limitations of competency evaluation have a significant impact on the effectiveness of training systems within SONATRACH TRC in Algiers .

Methodology and Data :

This research adopts a positivist epistemological stance, following a deductive and explanatory approach. The study employs a quantitative methodology based on a structured questionnaire administered to a sample of 135 respondents selected from employees of SONATRACH TRC who have participated in professional training systems. The research hypotheses are tested using multiple linear regression analysis.

Research Structure :

The structure of this study is organized into several sections. The introduction presents the context of competency evaluation within Algerian organizations, the research problem, as well as the objectives and hypotheses of the study, thereby establishing the analytical framework. **Chapter I** develops the theoretical framework by presenting the foundations of competency evaluation, the effectiveness of training systems, and a review of previous literature. **Chapter II** describes the research methodology, including data collection tools particularly the questionnaire as well as the contextual framework of SONATRACH TRC. **Chapter III** presents the empirical results and analyzes the impact of competency evaluation practices on the effectiveness of training systems within SONATRACH TRC in Algiers . Finally, the conclusion summarizes the main findings, provides practical recommendations, and suggests directions for future research.

CHAPTER 01: THEORETICAL FRAMEWORK

Preamble:

In order to achieve a precise understanding of our research problem, situate our study within its scientific framework, and review the most significant theoretical and empirical contributions related to competency evaluation and its impact on training systems, this chapter has been structured into three main sections.

The first section presents the theoretical foundations related to human resource management and competency assessment, drawing on Human Capital Theory and Competence Theory, as well as the theoretical foundations of evaluation in HRM. The second section offers a literature review analyzing previous studies on the effectiveness of training systems and methodological approaches. Finally, the last section is devoted to the conceptual framework, where the main concepts and variables related to competency assessment and training effectiveness are defined, providing a structure for analysis and linking the development of competencies to organizational objectives.

Section 01 : Presentation of the Main Theories Related to Competency

Evaluation and the Effectiveness of Training Systems :

The evaluation of competencies and the effectiveness of training systems are based on solid theoretical foundations that help explain how competencies are developed, activated, and contribute to individual and organizational efficiency. A large number of scientific theories have been developed to examine these mechanisms and their impact on human resource management.

1.human capital theory :

Human capital theory, developed through the works of Theodore Schultz (1961) and Gary Becker (1964), is based on the idea that education and training are important investments for individuals. The cost of this investment includes both training expenses and the opportunity cost of giving up immediate income, while the expected benefit is reflected in higher earnings throughout an individual's professional career. Therefore, by investing in education and training, individuals improve their knowledge and skills, which increases their chances of accessing better job opportunities and reducing the risk of unemployment. Human capital can thus be defined as the set of knowledge, competencies, and experiences acquired through education, training, and professional experience. It generally includes three main components: general skills, technology-related skills, and technical and scientific competencies. (GUILLARD & ROUSSEL, 2010)

2.Competence Theory :

The concept of competence was developed by Guy Le Boterf in his book *De la compétence : essai sur un attracteur étrange* published in 1994. According to Le Boterf, competence is not limited to theoretical knowledge or technical skills only, but also includes the ability of a person to use knowledge and experience in professional situations (Boterf, 1994).

Competence can be observed through the employee's ability to solve problems, adapt to changes, and make appropriate decisions at work. In this sense, competence is related more to practice and action than to theoretical knowledge alone.

Le Boterf also explains that competence depends on combining personal resources such as knowledge, skills, and experience with external resources like tools, documents, and

professional support. Therefore, competence develops through professional experience and continuous learning (Boterf, 2000).

In the same context, Philippe Zarifian states that competence refers to the employee's ability to take responsibility and deal effectively with work situations. According to Zarifian, competence develops progressively through professional experience and workplace interaction (Zarifian, 1999).

3.Theoretical Foundations of Evaluation in Human Resource Management (HRM) :

Competency evaluation is an important part of Human Resource Management because it helps organizations identify employees' strengths and weaknesses and determine the competencies that need improvement. It is also used in different HR activities such as recruitment, promotion, training, and performance appraisal (Levy-Leboyer, 1996).

Claude Levy-Leboyer explains that competency management helps organizations identify the competencies required for each position and compare them with employees' actual competencies. This helps organizations improve employee performance and manage human resources more efficiently (Levy-Leboyer, 1996).

Competency evaluation also has an important role in improving training effectiveness. By identifying competency gaps before training systems are implemented, organizations can provide training that responds to employees' actual needs. This helps employees improve their competencies and performance at work (Boterf, 2000).

In addition, competency evaluation should be continuous because work requirements and competencies may change over time due to technological and organizational developments. Continuous evaluation therefore helps employees adapt to these changes and develop their competencies continuously (Zarifian, 1999).

4.Theoretical Models for Evaluating Training Effectiveness :

One of the most known models used to evaluate training effectiveness is the model developed by Donald Kirkpatrick in 1959. According to Kirkpatrick, training effectiveness can be evaluated through four levels (Kirkpatrick, 1959).

- The first level is Reaction: it measures trainees' satisfaction and opinions about the training program.
- The second level is Learning: it evaluates the knowledge and skills acquired during training.

- The third level is Behavior: it examines whether employees apply what they learned in the workplace after training.
- The fourth level is Results: it focuses on the impact of training on organizational performance, such as productivity and employee performance (Kirkpatrick & Kirkpatrick, 2006).

This model shows that evaluating training effectiveness should not focus only on trainee satisfaction, but also on learning outcomes, employee behavior, and organizational results.

Besides Kirkpatrick's model, other models were also developed to evaluate training effectiveness. Among these models is the model developed by Jack Phillips, which added a fifth level called Return on Investment (ROI). This level focuses on measuring the financial benefits of training systems compared to their costs (Phillips, 1996).

Another model is the CIRO model developed by Peter Warr and his colleagues. This model evaluates training through four dimensions: context, input, reaction, and outcome. It is mainly used to identify training needs and evaluate training results (Warr, Bird, & Rackham, 1970).

Section 02 : Study of Previous Works Related to Competency Assessment and the Effectiveness of Training Systems (Literature Review)

In the context of our literature review, we analyzed various academic articles and books related to our research topic, which enabled us to compile the following references.

1. Competency evaluation :

The study (Wenjie & Ka Yuk Chan, 2025),entitled “Closing the Evaluation Gap: Developing a Behavior-Oriented Framework for Assessing Virtual Teamwork Competency”, and published by The University of Hong Kong (Teaching and Learning Innovation Center, Centennial Campus, The University of Hong Kong), aimed to develop a behavior-oriented framework for assessing virtual teamwork competencies among engineering students. The study employed a qualitative methodology, using focus group interviews and the critical incident technique to identify specific behavioral indicators and understand the relationships between them. The results revealed three main dimensions representing key elements of effective virtual collaboration: the collective task dimension, the individual task dimension, and the individual social dimension, accompanied by fifteen behavioral indicators illustrating how interactions among these dimensions contribute to effective performance in a virtual environment.

An other study by (Berkut, 2021), entitled “Évaluation de la compétence interculturelle: vers un modèle dynamique et contextuel” and submitted as a doctoral thesis on HAL (France), focused on intercultural competence assessment, critically examining traditional measurement tools that often fail to integrate context and individual experience, and emphasizing the dynamic nature of such competence. The study employed a qualitative methodology within a constructivist paradigm, using reflective and ethnographic approaches, with semi-structured interviews conducted with 30 participants from diverse cultural backgrounds, and inductive data analysis aimed at generating new concepts. The results showed that intercultural competence is neither hierarchical nor fixed, but rather interactive and dynamic depending on context, and that its components can be both internal and external simultaneously. The study also highlighted differences in developmental trajectories according to cultural profiles (intercultural profiles) and confirmed that competence is acquired through learning. Finally, the study proposed a new dynamic model that integrates context, the influence of others, and the transferability of competence.

In the Algerian context ,a study addressed the topic of structuring a competency and performance evaluation system “La structuration de système d'évaluation des compétences et de performances” at the company SOMIZ by (REZIGA , 2023), focusing on the challenges and limitations associated with implementing this new system in the human resources context. The methodology was based on description and analysis of the newly integrated system through a case study within the company. The results described how the new system for evaluating competencies and performance was built, identified the challenges and limitations encountered during implementation, and confirmed that the system represents a shift from traditional evaluation systems.

A Doctoral thesis addressed the topic of training engineering as a strategic tool in competency development “L'ingénierie de la formation un outil stratégique dans le développement des compétences” by (Akkacha, 2021), with a case study conducted within the GL3Z Arzew complex of SONATRACH company. The methodology was based on a case study approach, collecting data through face-to-face questionnaires with 103 trainees, analyzing the results using SPSS software, and including document and annual report analysis of the company. The results highlighted the importance of strategic training engineering as a fundamental means for developing competencies among employees and trainees, emphasizing the necessity to adapt it to organizational needs within the human resources context.

2. The Effectiveness of Training Systems:

The Doctoral thesis addressed the topic of co-constructing training devices in work situations: towards an opportunity-based pedagogy “Co-construire des dispositifs de formation en situation de travail : vers une pédagogie de l'opportunité”, with an application to the training of firefighters in SDIS 31, France by (Delbreil, 2025).The methodology was based on participatory intervention research and ethnography with field immersion, including workgroups, interviews, video recordings, and joint self-analysis to design and evaluate three experimental training devices (DEFEST) using a hybrid approach (AFEST + digital platform). The results showed that co-constructed devices are effective in enhancing learning in work situations, personalizing training pathways, improving skill transfer, and adapting to operational realities, while also reducing costs and enhancing recognition of professional knowledge, despite variations depending on participant involvement.

To examine the impact of applying Training Needs Analysis (TNA) on employee performance, a study titled “The Influence of Applying Human Resource Training Needs

Analysis on Employee's Performance" (Alzahmi & Alshamsi, 2024) was conducted. The study focused on factors of TNA, including the type of training, its objectives, and its effect on job performance. The research employed a mixed-methods approach (qualitative and quantitative), relying on both academic and applied literature relevant to the topic, followed by the distribution of an online questionnaire to collect the opinions of employees from two private banks in the UAE regarding human resource and training practices. Data were analyzed using XLSTAT software. The results revealed that TNA practices, including identifying the type of training, its objectives, and its impact, positively and directly influence employee performance. The study concluded that adopting these practices plays a role in enhancing job performance and practically supports HR managers in developing effective training systems that foster business growth.

Another study analyzed ways to enhance the effectiveness of training systems in small enterprises. "Enhancing the Effectiveness of Employee Training Systems in the HR Departments of Small Enterprises in the UAE: A Focus on the Cultural Sector" (Kashmola, 2025) examined how to improve training outcomes for employees in small HR enterprises within the cultural sector in the United Arab Emirates. The study focused on the impact of training practices such as blended learning, mentoring, and coaching, as well as the suitability and adaptability of training content to the cultural diversity of employees. The study employed a quantitative approach, collecting data from 200 employees working in museums, art galleries, and heritage sites. Data were analyzed using Structural Equation Modeling (SEM) with Smart PLS software to investigate the effects of training program characteristics on employee performance, job satisfaction, and retention. The results indicated that training effectiveness depends on three key elements: tailoring learning methods, using culturally appropriate instructional techniques, and leveraging technological resources for knowledge acquisition. The study also confirmed that HR practices aligned with economic, industrial, and organizational standards enhance the success of training systems and improve employee performance, as well as their ability to adapt to the organizational and cultural requirements of the sector .

The study by (Goumari, 2025) addressed the topic of evaluating the impact of vocational training on the professional integration of graduates "Évaluation de l'impact de la formation professionnelle sur l'insertion des diplômés : cas des lauréats de l'OFPPT", focusing on the effectiveness of vocational training systems. The methodology was based on a descriptive analytical study to measure the impact on professional integration. The results showed that the effectiveness of training systems (including digital versions) is closely related to the relevance

of content, the quality of the pedagogical framework, and accessibility, which contributes to improving graduates' employment opportunities despite certain limitations.

3. The Relationship Between Competency Evaluation and Training Effectiveness:

To understand the relationship between training and performance evaluation in human resource development, a specialized study was conducted by (Schweizer, 2024) , addressed the topic of developing initial vocational training systems for local government employees in West Africa “Le développement des dispositifs de formation professionnelle initiale pour les agents des collectivités territoriales en Afrique de l’Ouest”, with a comparison between the systems of Burkina Faso, Mali, and Niger, based on French and German experiences. The methodology relied on a comparative analytical study of training systems and competency frameworks. The results showed that accurate competency assessment (référentiels de compétences and état des compétences) is a fundamental condition for designing effective training systems, as it improves the relevance, sustainability, and qualitative and quantitative effectiveness of the overall training system.

Building on the importance of competencies in human resource management, the need has emerged to examine the impact of career development and training systems on employee performance. a specialized study was conducted “Evaluation of Competency-Based Career Development and Training systems in Improving Employee Performance: A Theoretical and Practical Study in Manufacturing Companies” (Bahiroh & Arthawati, 2025) aimed to analyze the effectiveness of career development systems and competency-based training in enhancing employee performance within manufacturing companies. From a theoretical perspective, the study establishes a link between competency theory, motivation theory, and career development theory to understand the impact of developing individual competencies on organizational performance. Methodologically, the study relied on library research through reviewing and analyzing scientific literature, research journals, and practical reports related to human resource management, without collecting field data. The research process focused on defining the topic, selecting reliable sources, analyzing content, and formulating a conceptual framework of the relationship between variables .The results indicated that career development systems and competency-based training enhance employee motivation, productivity, and organizational loyalty, while increasing work quality, employee satisfaction, and performance efficiency. The study also emphasizes the importance of policy integration, top management support, and continuous evaluation to ensure the success of these systems and to strengthen companies' ability to face complex industrial challenges.

In the context of enhancing human resource effectiveness, the study “the impact of the competency-based training (CBT) model on the clinical training of newly recruited nurses” was conducted by (Chen, Zhang, & Li, 2022) . The methodology was based on a review and analysis of the impact of the competency-based training model, with an evaluation of outcomes. The results showed that competency assessment within the CBT model improves the effectiveness of clinical training systems, and contributes to the development of practical competencies and the reduction of skill gaps among new nurses.

4.Digital Innovation in Human Resource Management: A Lever for Improving Competency Evaluation and the Effectiveness of Training Systems

This study aimed to examine how digital transformation in human resource management contributes to the development of digital competencies among HR professionals and improves the effectiveness of training programs. In the study entitled “HR Digital Transformation: Enhancing Human Resource Management through Technology”, (Garem, 2026) adopted a quantitative cross-sectional approach by distributing questionnaires to HR specialists in Egyptian technology companies. The collected data were analyzed through structural equation modeling. The findings revealed that the use of artificial intelligence and digital tools positively supports the development of digital competencies, which enhances the effectiveness of training and development systems and makes them more adapted to organizational needs.

(Kılınç, Yücel, & Yücel, 2025)sought to explore the impact of digitalization on training and development processes within human resource management through their study entitled “The Effect of Digitalization on Human Resources Management Training and Development Processes”. The researchers paid particular attention to the role of digital technologies in competency evaluation and the improvement of training quality. To conduct the study, they relied on a literature review combined with an analysis of recent digital HR practices. The results indicated that technologies such as artificial intelligence, mobile learning, and virtual platforms allow more accurate competency assessment and make training systems more flexible, personalized, and effective in developing employees’ skills.

The study entitled “The Effectiveness of Competency-Based Training Program Classes on Human Resources Performance in the Creative Industry Sector” investigated the effectiveness of competency-based training systems in the creative industry sector. (Farawowan & Hardianti, 2025) focused on the importance of competency evaluation and the integration of digital technologies into training systems. The researchers adopted a systematic literature

review approach covering 50 studies published between 2020 and 2025. The findings highlighted that competency-based training supported by digital tools such as e-learning and virtual reality significantly improves creativity, innovation, and overall human resource performance.

(Dao, Sisavath, Bui, Bui, & Le, 2025) examined the relationship between digital workforce training and employee performance in their research entitled “Digital Workforce Training, Employee Motivation, Job Satisfaction, Digital Behavior as Determinants of Employee Performance: Empirical Research from Vietnam”. The study also considered motivation and job satisfaction as mediating variables. The researchers employed a quantitative empirical approach using surveys and statistical analysis conducted in small and medium-sized enterprises in Vietnam. The results confirmed that digital training supported by continuous competency evaluation plays an important role in improving employees’ skills and increasing the effectiveness of training systems in digital work environments.

Section 03 : The Conceptual Framework

Box 01: Theoretical Foundations of Competency Evaluation and Training Systems Conceptual

This box presents the essential theoretical concepts related to competency evaluation and the performance of training systems. It is necessary to understand these concepts in order to analyze the processes and issues associated with competency evaluation in the context of training programs.

1. Foundations of Competencies and Competency Evaluation :

This part covers the fundamental concepts of competencies and their assessments, essential for improving and developing human capital.

1.1. Competence :

Competence is a central focus in human resource management, guiding the development, performance, and evaluation of employees within organizations. It reflects the ability to effectively apply knowledge, skills, and behaviors in professional contexts and serves as a foundation for aligning individual capabilities with organizational objectives.

1.1.1. History of Competency :

The concept of competence can be traced as far back as 3000 years ago when the Chinese employed written civil service exams, replacing recommendations by superiors ,in selection for government jobs. In the medieval age ,apprenticeship was introduced. Apprentices were expected to learn skills by working with a master and were awarded credentials after they reached the standards of workmanship set by the trade .With the industrial revolution, major socioeconomic changes took place in sectors such as agriculture, manufacturing, production, and transportation. The study of work and jobs in these sectors and skills needed to do these jobs emerged. Near the turn of the 20th century, social efficiency became a dominant social idea in the United States. Frederick Winslow Taylor, who was called the father of scientific management ,became a significant figure with the development of management thinking and practice. Taylor (1911) proposed greater division of labor, with jobs being simplified, an extension of managerial control over all elements of the workplace, and cost accounting based on systematic time-and-motion study. All of these elements were associated with the rise of the concept of competence .The concept of competence continued to develop in management with a focus on work and employee selection.

In the 1930s in the United States, the Roosevelt administration promoted functional analysis of jobs, which resulted in the publication of a dictionary of occupational titles identifying knowledge and skills connected to different occupations (Horton, 2000). In the 1940s and 1950s, researchers started systematically identifying and analyzing broad performance factors. Beginning in the 1960s, many psychologists researched individual variables that would effectively predict job performance without inherent bias against subgroups.

In 1978, the U.S. government published the Uniform Guidelines on Employee Selection Procedures. The Guidelines clearly stated that the selection of workers had to be based on job-related qualifications that resulted from the analysis of the essential work behaviors and desired outcomes of the job (Equal Employment Opportunity Commission, Civil Service Commission, Department of Labor, & Department of Justice, 1978). In 1994, Congress created the National Skill Standards Board (NSSB), which became the National Skill Standards Board Institute (NSSBI) in 2003. In addition, in 1973, the renowned American psychologist David McClelland wrote a research paper entitled “Testing for Competence Rather Than for Intelligence,” through which the term “competence” was effectively introduced into the field of talent management.

More recently, the concept of competencies was highlighted by Dr. Malcolm Knowles in his work on adult education and lifelong learning. He focused on what he termed “andragogy,” referring to adult learning, and emphasized the concept of competencies as an essential foundation for defining what is required to perform leadership tasks. He also indicated that leadership learning requires a set of competency components, such as communication skills and delegation (Wilcox, 2012).

1.1.2. Definition of Competence :

Linguistically :

In Al-Maani Al-Jami‘ Dictionary, competence (al-kafaa) is a noun that denotes similarity, strength, honor, and the eligibility to perform a task properly and manage it well. It is said, for example, “He has no equal” meaning he has no counterpart or equal.

- Definition according to Ibn Faris (Kafaa) :

The letters Kaf (ك), Fā (ف), and Hamza (ء) are the root of the word. One of them indicates equality between two things, while another denotes inclination or aptitude. The first sense implies equivalence: “Kafāa fulān” means that he matches another in the quality of his deed,

and “al-kafī” refers to a peer or equal. The Qur’an states: “And there is none comparable to Him” (Surah Al-Ikhlās, verse 4). The term takāfu’ refers to equality or equivalence.

Several professional dictionaries have addressed the concept of competence:

- Oxford Dictionary defines it as the ability to do something correctly. A competent person is someone who possesses the necessary ability, authority, skill, and knowledge to perform a task properly.
- Lagos Commercial and Industrial Dictionary defines competence as a set of knowledge, abilities, and behaviors used in discussions, consultations, and decision-making regarding all matters related to a profession.
- Collins Birmingham University English Language Dictionary (1987) defines competence as the ability, where a person described as competent possesses the skills and knowledge required to perform a particular task or role. Its opposite is incompetence (Zakariya, 2020) .

Terminologically:

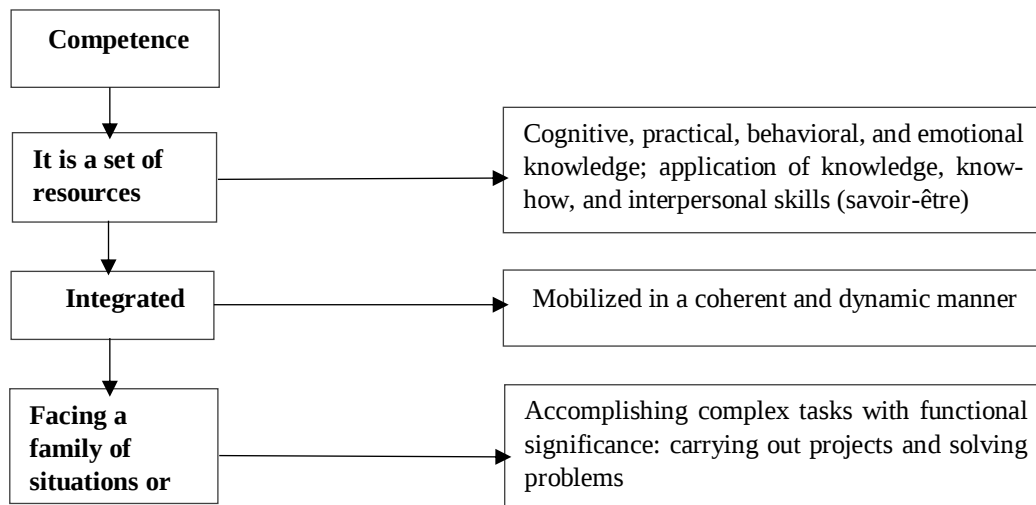
G. Bernaerdt et al. define competence as “an integrated and functional set of knowledge (savoir), practical knowledge (savoir-faire), behavioral knowledge (savoir-être), and action-oriented knowledge (savoir-agir/devenir), which allows adaptation to specific situations, project implementation, problem-solving, and task accomplishment.”

Xavier Roegiers defines competence as “an integrated set of abilities that enables the learner, in an autonomous manner, to face a given situation and deal with it appropriately.”

Viviane Delansheere states that competence refers to “the ability to perform or complete a specific task in a satisfactory manner or style.”

Philippe Perrenoud defines competence as “the ability to interact effectively when facing a situation that may not be fully controllable, thanks to the possession of necessary knowledge and the capacity to apply it at the right time.” (Lallouche, 2023)

Figure 1: Definition of Competence



Source: prepared by the authors according to (Lallouche, 2023)

This figure illustrates that competency is not a single element but rather an integrated combination of knowledge, skills, attitudes, and practical abilities. This perspective provides the theoretical foundation for the definition of competency adopted in the present study.

Table 1: definition of competence

Researcher	Year	Definition/Concept of Competencies
Boyatzis	1982	Designed a managerial competency model after studying over 2,000 managers, identifying more than 100 potential managerial competencies.
Albanese	1989	Emphasized that a single set of competencies cannot fully cover all aspects of a managerial role.
Spencer et Spencer	1993	Developed a method for assessing job competencies, shifting the focus from traditional job descriptions to building a competency model based on individual characteristics linked to performance from average to excellent.
Mansfield	1996	Analyzed three sources for building competency frameworks: focus groups with experts, general competency dictionaries, and critical incident interviews with high-performing individuals.
Lucia et Lepsinger	1999	Considered competencies as a detailed tool to identify the knowledge, skills, abilities, and behaviors required to achieve effectiveness within an organization.
Shippmann et al	2000	Recommended that most jobs usually require between seven to nine competencies, depending on the nature of the work and organizational context.
Garavan et McGuire	2001	Advocated studying competencies in an environment that allows examining the employee as a whole individual, not only from a job perspective.
Brophy et Kiely	2002	Explained that the competency-based approach focuses on behaviors necessary for job performance, emerging from research seeking to predict human performance beyond traditional intelligence tests.
Hollenbeck, McCall et Silzer	2006	Argued that the competency model does not provide a ready-made recipe for successful leadership, but is an attempt to extract leaders' experiences, knowledge, and learning.

Source :elaborated by the authors based on (SATEESH V.Shet, 2017)

The table presents the evolution of the competency concept over time through the perspectives of several scholars between 1982 and 2006. This historical overview illustrates how the concept of competency evolved from a managerial model to a comprehensive approach focused on the individual and performance.

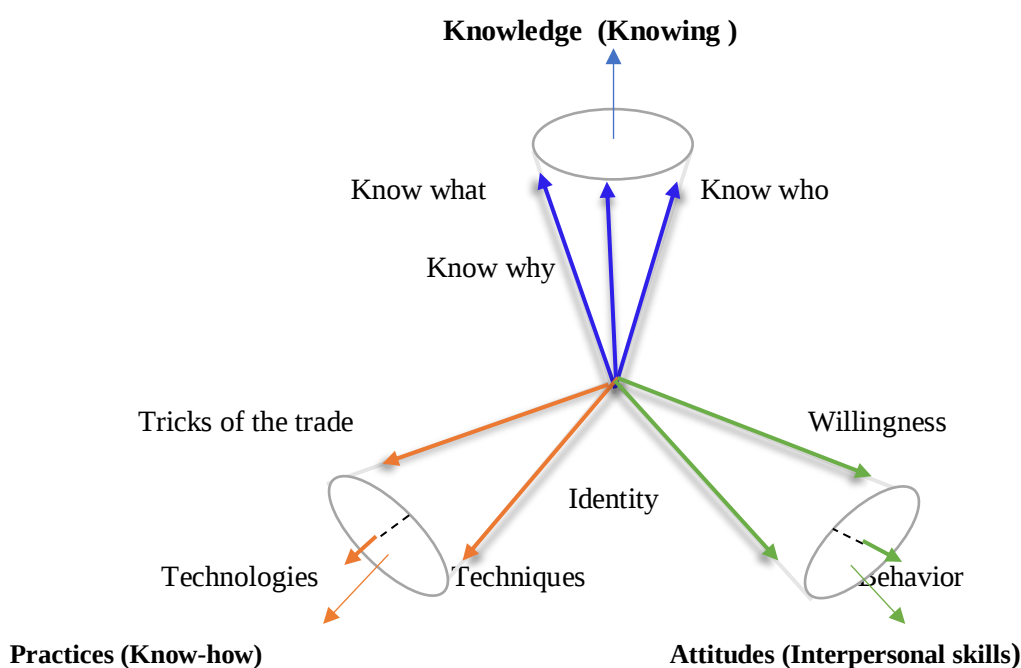
1.1.3. Components of Competency :

Competencies are composed of:

- **Aptitudes:** These are qualities inherent to an individual; they characterize natural or acquired dispositions. They may or may not be utilized in a given position. Aptitudes are partly identifiable, notably through tests or situational exercises.

- **Abilities (Capacities):** These are applied through mastered knowledge and skills: "being capable." Abilities depend on aptitudes but are particularly the result of learning and training. Abilities are not directly observable; they are defined based on the mental operations necessary to master a knowledge or skill. A single competency may require several different abilities. Abilities determine the individual's level of qualification.
- **Performance:** This measures the result of an individual's activity in a given position. Performance should be considered in relation to abilities, competencies, work organization, interpersonal relationships, and the overall work climate. (KARA & MENDIL , 2013)

Figure 2: The three categories of competence (knowledge, skills, attitudes).



Source: Developed by the authors

The figure classifies the components of competency into three fundamental categories: knowledge (Knowing), skills (Doing), and attitudes (Being). This three-dimensional classification constitutes the conceptual foundation for understanding the structure of individual competency.

1.1.4. Typologies of Competencies :

In Human Resource Management (HRM), competencies can be classified into several main categories that help better understand employees' performance and organizational effectiveness.

- **Core Competencies:**

These are the key capabilities that give the organization a competitive advantage and allow it to differentiate itself from competitors and create value for customers. (Hamel & Prahalad, 1990)

- **Technical (Functional) Competencies:**

These refer to the specific knowledge and skills required to perform a particular job, usually acquired through education and professional experience.

- **Behavioral Competencies:**

These include interpersonal and personal skills such as communication, teamwork, and adaptability, which play an important role in improving work relationships and performance (Boyatzis, 1982)

- **Managerial Competencies:**

These are the competencies related to managing people and organizational processes, such as decision-making, leadership, and planning (Mintzberg, 2009)

1.1.5. Levels of Competence :

Competence results from the accumulation and combination of several elements, namely:

A. Data:

Data are defined as “raw material or facts related to events that can be identified and measured.” These facts are often independent of one another, which means they cannot be fully exploited in their raw form. However, when data are processed, organized, and structured, they can be transformed into information that can be used in management processes.

B. Information:

Information is “the result of processing data through analysis or synthesis in order to extract indicators, relationships, comparisons, balances, and ratios contained within them.” Information possesses several properties that are essential in the decision-making process. To be effective, it must have the following characteristics:

- **Timeliness:** Information must be available at the appropriate time to support decision-making.

- **Accuracy:** Information must be correct and describe facts precisely and without ambiguity.
- **Relevance:** Information must correspond to the actual needs of the decision-maker.
- **Completeness:** Information must cover the entire domain concerned in order to provide the decision-maker with a clear view when making decisions.
- **Readability:** Information must be presented in a clear and understandable manner.

C. Knowledge:

In its broad sense, knowledge is defined as “the set of elements that human beings acquire through their senses, intuition, and research in the form of meanings, concepts, perceptions, ideas, observations, experiences, or inspirations.” It satisfies the natural curiosity of human beings and their desire to understand the world around them.

Organizations develop knowledge through their intellectual capital and interactions among employees and the external environment. The effective use of knowledge contributes to innovation, organizational development, and the creation of competitive advantage.

D. Experience:

Experience refers to the actual and continuous practice of work over a long period of time, which leads to the acquisition of precise knowledge of an activity through its practical application.

Finally, the difference between information and knowledge lies in the fact that information consists of organized and structured data designed to meet specific needs, whereas knowledge refers to the understanding and interpretation of this information and the ability to use it effectively.

Knowledge has value only when it is invested and transformed into wealth through its application. As a human resource, it differs from material resources in several characteristics:

- Knowledge is less likely to be lost, consumed, or become obsolete.
- It develops both quantitatively and qualitatively through dissemination and sharing.
- It is more easily transferable, renewable, and evolving at a relatively low cost.
- It experiences both horizontal and vertical growth.

(BOUCHKIRI & MAKMEN, 2022)

1.1.6. Fundamental Dimensions of Competence :

The definition of competence shows that it is characterized by a set of interacting elements, namely knowledge, know-how, and behavioral attributes, among others.

- **Knowledge Dimension (Savoir):**

Knowledge refers to the set of information and understanding possessed by an individual as a prerequisite for carrying out activities. This highlights the necessity of knowledge, although it may not be sufficient on its own.

- **The Know-how Dimension (Savoir-faire):**

This dimension refers to the ability and willingness of an individual to perform an activity and apply their knowledge in practice. It is expressed by the notion of “being able to,” and it can be identified through the observation of individuals in their work situations.

- **The Behavioral Dimension (Savoir-être):**

The performance of an organization largely depends on the quality of the behaviors of its members, which explains the importance of integrating behavioral competencies into the concept of competence. These competencies reflect how an individual deals with a specific problem, their communication abilities, initiative-taking, stress management, and other related behaviors.

- **The Cognitive Dimension:**

Cognitive competence refers to the ability to mobilize multiple forms of knowledge, know-how, and behavioral skills in order to develop an appropriate response to a problem that arises within the organization.

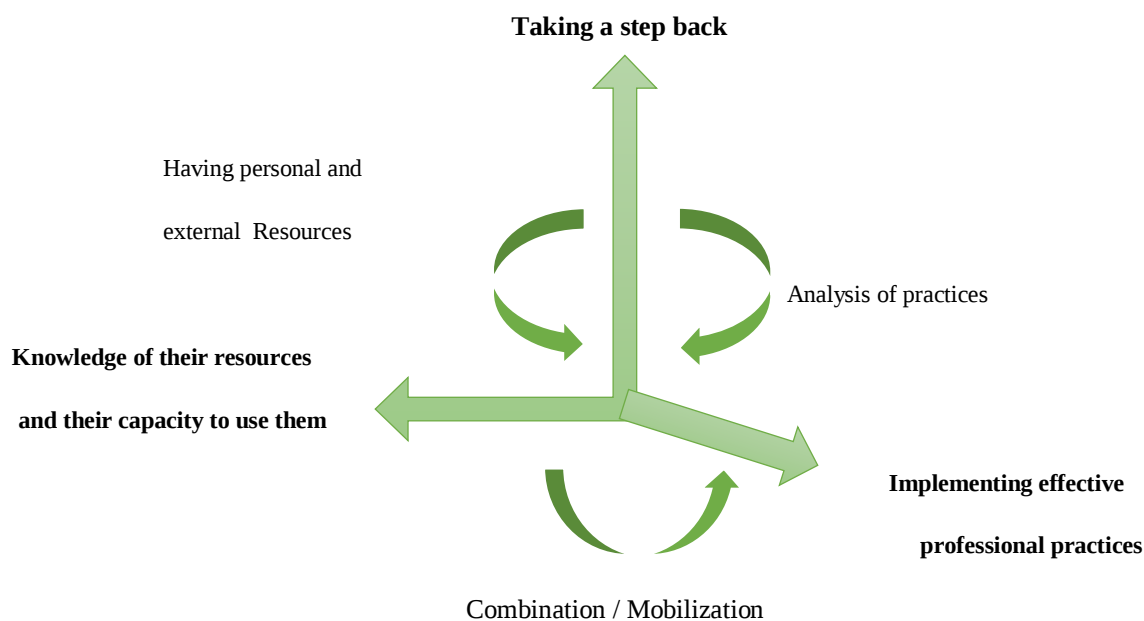
- **The Potential Dimension:**

Potential refers to the proven capacity demonstrated in various work situations. It corresponds to the effective application of competencies and depends largely on the context in which they are exercised.

- **The Talent Dimension:**

Talent is a personal attribute that appears particularly in professions characterized by a strong “talent” component (such as actors or poets). It represents a relatively rare dimension among individuals, which explains its significance. (BELMAHDI , 2023)

Figure 3: The three dimensions of competence



Source: Adapted by the authors from (Boterf, 2011)

The figure illustrates the three dimensions of competency: knowledge, abilities, and talent, while distinguishing between elements that can be developed and those that are relatively stable individual characteristics. This distinction is important for understanding the limits and potential of training systems.

1.2. Evaluation :

Evaluation plays a key role in shaping learning and training processes, guiding improvements, and supporting strategic decisions in organizations.

1.2.1. Definition of Evaluation :

Evaluation is generally understood as a systematic and structured process through which information is collected and analyzed in order to determine the value, quality, or effectiveness of a program, activity, or performance. It also serves as a basis for decision-making and continuous improvement.

The literature on evaluation highlights different but complementary perspectives. Evaluation is often presented as the judgment of the merit or worth of an intervention based on

specific criteria, which means that it is not limited to measurement but also involves interpretation and value judgment (Scriven, 1967).

In the field of program evaluation, particularly in educational and training contexts, the CIPP model emphasizes that evaluation should be seen as a continuous process used to support decision-making through the collection of relevant information related to context, input, process, and product (Stufflebeam, 1971). This approach highlights the importance of ongoing feedback for improving programs.

From a methodological perspective, evaluation is also defined as a structured process of data collection and analysis aimed at assessing the effectiveness of systems or performance, while ensuring fairness and credibility in judgment (Mertens, 2015).

In addition, evaluation is not limited to describing results; it is mainly used as a decision-making tool that helps improve performance. It includes both formative and summative dimensions, which makes it essential for assessing learning outcomes and organizational effectiveness (Gronlund, 2006).

- **General Definition**

In general, evaluation can be defined as a systematic, objective, and scientific process that involves collecting and analyzing information in order to assess the value and effectiveness of a program or performance. It also aims to support decision-making and improve future outcomes within organizations.

1.2.2. Importance of Evaluation :

Evaluation plays a central role in educational and training programs, as it contributes not only to measuring results but also to improving performance and supporting decision-making processes.

- **Improving learning outcomes and effectiveness:**

Evaluation makes it possible to assess the effectiveness of training systems and their impact on learners' performance. It also helps organizations adjust training content and methods so that they better correspond to the expected objectives (Kirkpatrick & Kirkpatrick, 2006).

- **Supporting decision-making:**

Evaluation provides useful and reliable information that helps managers make more informed decisions, whether related to improving programs, allocating resources, or planning future actions (Brinkerhoff, 2005).

- **Enhancing accountability and transparency:**

Evaluation contributes to ensuring that systems achieve their objectives and produce the expected results. It also helps make the evaluation process more transparent, which increases trust among stakeholders (Lipsey & Wilson, 2001) .

- **Continuous improvement and innovation:**

Evaluation is not limited to measuring results; it also helps identify weaknesses and areas that need improvement. This allows organizations to continuously develop their systems and adapt to changes in their environment (Creswell & Plano Clark, 2018).

1.2.3. Evaluation Criteria :

Performance evaluation in Human Resource Management is considered a multidimensional process that does not focus only on final results, but also takes into account employee behaviors and underlying competencies. In this context, (DeNisi & Murphy, 2017) highlight that performance appraisal should integrate results, behaviors, and competencies in order to provide a comprehensive assessment of employee performance.

1.2.3.1.Results-Based Criteria (Outcome Criteria) :

This dimension focuses on the tangible outputs achieved by employees within the organization.

- **Goal achievement:** It refers to the extent to which employees succeed in reaching the objectives assigned to them, while ensuring alignment between individual and organizational goals.
- **Quantity of work:** This criterion measures the amount of work completed within a specific period, including the number of tasks or activities performed, which reflects employee productivity.
- **Quality of work:** It focuses on the level of accuracy and conformity of the work performed with organizational standards, as well as the satisfaction of supervisors or clients.

- **Timeliness:** This aspect evaluates the ability of employees to complete tasks within the required deadlines, reflecting their efficiency in time management.

1.2.3.2. Behavioral Criteria (Work Behaviors) :

This dimension evaluates how employees perform their tasks and interact within the workplace.

- **Teamwork:** It reflects the ability of employees to cooperate with colleagues, share information, and contribute to collective goals.
- **Communication:** It concerns the clarity and effectiveness of information exchange and the ability to interact positively within the work environment.
- **Initiative:** It refers to employees' willingness to propose ideas, take action beyond assigned duties, and contribute to organizational improvement.
- **Discipline:** It includes respect for organizational rules, punctuality, and compliance with hierarchical procedures.
- **Problem-solving ability:** It refers to the capacity to analyze situations, identify solutions, and make appropriate decisions in complex work contexts.

1.2.3.3. Competency-Based Criteria:

This dimension focuses on the skills, knowledge, and personal attributes that influence employee performance.

- **Technical skills:** These refer to the mastery of tools, techniques, and job-specific methods required to perform tasks effectively.
- **Professional knowledge:** It includes understanding organizational procedures, regulations, and professional standards related to the job.
- **Learning ability:** It reflects the employee's capacity to acquire new skills and adapt to organizational changes through continuous development.
- **Leadership:** It refers to the ability to guide, influence, and coordinate team members, as well as make effective decisions.
- **Motivation:** It represents the level of commitment, engagement, and persistence shown by employees in achieving organizational objectives.

1.3. Competency Evaluation :

Evaluating employee competencies has become a critical focus. It plays a central role in shaping training programs, supporting professional growth, and ensuring that workforce capabilities meet evolving organizational demands.

1.3.1 Definition of Competency Evaluation :

The evaluation of competencies can be understood as a structured process aimed at identifying and assessing employees' skills, knowledge, and abilities in relation to job requirements. This process is mainly used to support human resource development and to guide decisions related to training, career development, and performance improvement. (Salleh & Sulaiman, 2015)

1.3.2. Typology of Personnel Competency Evaluation :

The main types include evaluation by hierarchy, by a supervisor, and by the employee themselves. (RAIAH & YAICHE , 2022)

- **Evaluation by Hierarchy:**

This type of evaluation is the most common in organizations. In most cases, it is carried out by the hierarchical superior who evaluates the performance of their subordinates, generally during the performance appraisal interview, sometimes with the assistance of the human resources department.

- **Evaluation by the Supervisor:**

Different evaluation procedures are conducted by the supervisor, who also provides suggestions to improve competencies and maintains contact with other participants in order to ensure an effective evaluation system.

- **Evaluation by the Employee (Self-Evaluation or Co-Evaluation):**

In addition to hierarchical evaluation, employees may be asked to conduct their own evaluation. This often takes place during the appraisal interview with the superior. In other words, self-evaluation is usually associated with the supervisor's evaluation. It encourages employees to be more involved in their work, helps them achieve their objectives, and prepares them for the evaluation interview. Self-evaluation also reflects the individual's behavior and their perception of themselves.

- **Evaluation by Subordinates:**

This type of evaluation involves assessing an employee by their own colleagues or subordinates. For example, a manager may be evaluated by their team members.

1.3.3. Competency Evaluation Process :

The competency evaluation process is defined as a structured and systematic approach that allows organizations to manage and develop employee competencies in alignment with job requirements (Peretti, 2019). It is also considered a continuous human resource management process that supports organizational performance through the effective use of employee capabilities (Gilbert, Parlier, & Pigeyre, 2013)

A. Identification of Required Competencies :

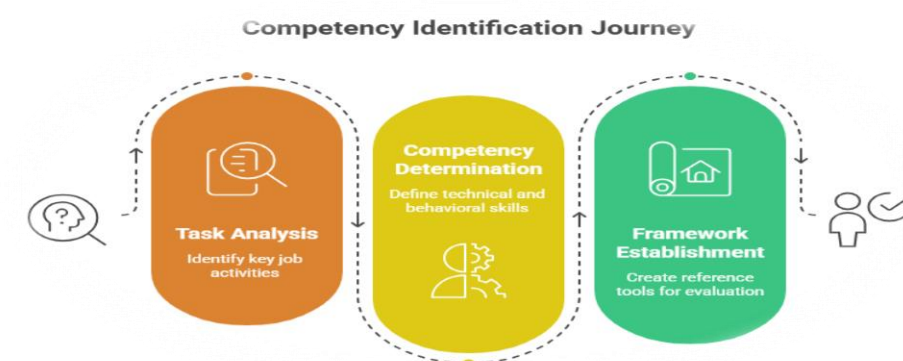
This initial stage focuses on defining the competencies needed for each job position based on a thorough analysis of work activities (Gilbert, Parlier, & Pigeyre, 2013)

It involves:

- identifying the key tasks and responsibilities associated with the position,
- determining the technical and behavioral competencies required to perform these tasks effectively, and
- establishing competency frameworks that serve as reference tools for evaluation.

This step ensures alignment between employee competencies and organizational strategy by linking job requirements with long-term objectives (Peretti, 2019)

Figure 4: competency identification journey



Source :prepared by the authors

The figure illustrates the process of competency identification within the organization, starting from job analysis and leading to the development of competency frameworks. This process establishes a link between job requirements and the organization's strategic objectives.

B. Observation and Data Collection

At this stage, organizations collect information about the competencies actually demonstrated by employees in real work situations (Cadin, Guérin, & Pigeyre, 2012)

This process includes:

- direct observation of employee performance in the workplace,
- analysis of professional practices and behaviors, and
- collection of qualitative and quantitative data.

Furthermore, data collection is reinforced through multiple sources such as supervisor evaluations, peer feedback, and structured assessment tools, which improve the reliability and objectivity of the evaluation process (Martory & Crozet, 2016)

C. Competency Assessment :

This stage consists of comparing the observed competencies with the required competencies in order to determine the level of employee proficiency (Martory & Crozet, 2016)

It involves:

- measuring the degree of competency mastery,
- evaluating performance against predefined criteria, and
- identifying strengths and weaknesses.

Moreover, competency assessment provides essential information for understanding employee performance and supporting managerial decisions related to development (Gilbert, Parlier, & Pigeyre, 2013).

D. Gap Analysis :

Following the assessment, organizations conduct a gap analysis to identify discrepancies between existing competencies and required competencies (Gilbert, Parlier, & Pigeyre, 2013). This step includes:

- comparing current employee competencies with job requirements,

- identifying competency gaps and deficiencies, and
- classifying development priorities.

In addition, gap analysis supports strategic decision-making by highlighting areas where training and development efforts are most needed (Peretti, 2019)

E. Decision-Making and Development Actions:

Based on the results obtained, organizations implement actions aimed at improving employee competencies (Peretti, 2019). This stage involves:

- designing and implementing training programs,
- promoting internal mobility or career advancement, and
- adapting job roles to better match employee capabilities.

At the same time, these actions contribute to enhancing both individual performance and organizational effectiveness (Cadin, Guérin, & Pigeyre, 2012)

F. Follow-up and Continuous Improvement :

The final stage focuses on monitoring and evaluating the effectiveness of the actions implemented (Martory & Crozet, 2016)

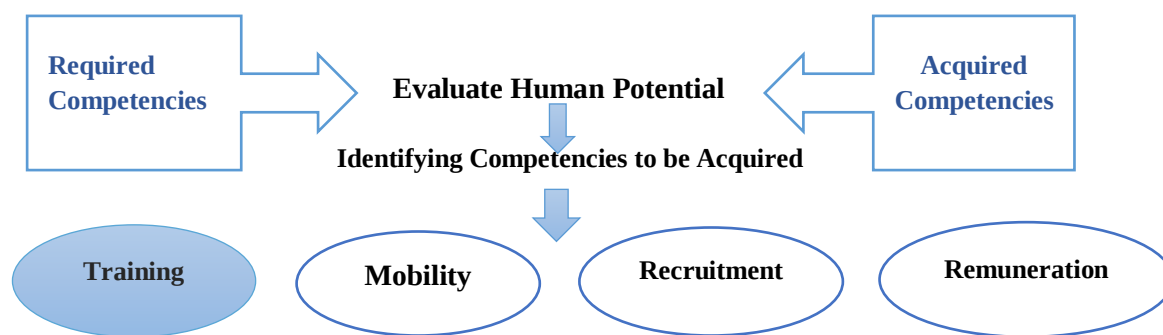
It includes:

- assessing the impact of training and development initiatives,
- adjusting competency management practices based on results, and
- ensuring continuous improvement of employee competencies.

Additionally, continuous follow-up enables organizations to adapt to environmental changes and maintain long-term performance (Cadin, Guérin, & Pigeyre, 2012)

Overall, the competency evaluation process is a continuous and integrated system that combines identification, assessment, analysis, and development. It plays a crucial role in aligning employee competencies with organizational needs and in supporting sustainable performance.

Figure 5: Evaluation: The engine of the competency-based approach



Source: Adapted by the authors from (Millet, 2008)

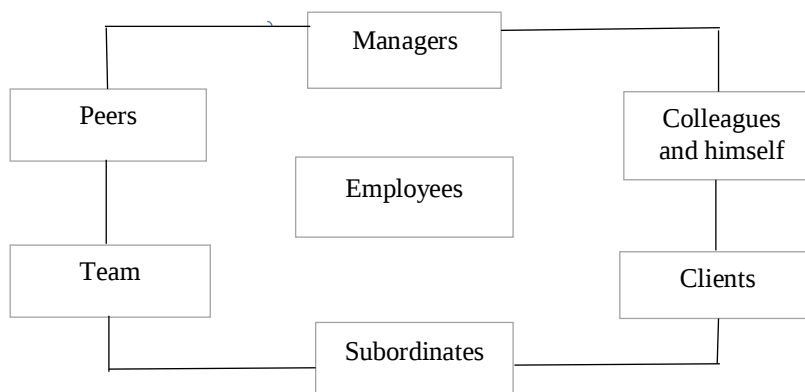
The figure presents competency evaluation as a key driver of the competency-based approach, through the comparison between acquired competencies and required competencies. This comparison helps identify competency gaps and guides training-related decisions.

1.3.4. Methods of Competency Evaluation :

There are several methods of competency evaluation, each adapted to different contexts and objectives.

- **Peer Evaluation:** Peer evaluation refers to the assessment of an employee's competencies by colleagues who work closely with them in the workplace. This method is useful because it is based on daily interactions, which allows peers to provide more realistic and practical feedback about behaviors and work-related skills (Dessler, 2020).
- **Self-Evaluation:** Self-evaluation is a method in which employees are invited to assess their own competencies according to predefined criteria. It encourages individuals to reflect on their performance and helps them identify both their strengths and areas that need improvement, which can support their professional development (Noe, 2020)
- **360-Degree Evaluation:** The 360-degree evaluation method is based on collecting feedback from different sources, including supervisors, colleagues, subordinates, and sometimes clients. This approach provides a broader and more comprehensive view of employee competencies and is often used to enhance performance and develop leadership skills (Fleenor, Smither, Atwater, Braddy, & Sturm, 2010)

Figure 6: : 360 Degree Evaluation



Source : Adapted by the authors

The figure summarizes the 360-degree evaluation method, which integrates assessments from multiple sources, including supervisors, colleagues, subordinates, and the employee himself/herself. This approach provides a more comprehensive and balanced view of the employee's competencies.

- **Skills Tests :**

These tests are designed to evaluate an employee's specific skills in a particular area, such as technical or language skills. The results of these tests can help identify areas in which the employee needs further development.

- **Simulations :**

These practical exercises allow employees to apply their skills in simulated situations. The choice of a skills assessment method depends on the specific objectives of the evaluation and the context in which it takes place. Some methods may be more appropriate for evaluating particular skills, while others provide a broader view of the employee's competencies .

(NAIT MANSOUR & TAROUDJIT , 2023)

- **Individual Interviews :**

This is a face-to-face meeting between the employee and their immediate supervisor. The purpose is to review the past year (strengths and weaknesses) and set objectives for the upcoming year. Individual interviews are now widely used in companies of all sizes and sectors, regardless of position or function. They can be conducted annually or semi-annually. When annual, they usually take place at the end of November or early December, and last between one and four hours. (OUAR & OUATMANI, 2017)

- **Group Interviews :**

A group interview involves multiple employees but is generally preceded or followed by an individual interview. Collective evaluations are particularly suited to project-based work or autonomous teams. While still relatively rare, the use of group interviews is growing. Group interviews follow individual interviews to address more specific, personalized points, providing a more comprehensive overall view of an employee's competencies. (OUAR & OUATMANI, 2017)

- **Assessment Center :**

An assessment center is designed to evaluate candidates' behavior and potential, particularly in the context of professional development within a company. It involves a structured simulation or role-play, rigorously conducted by observers using a behavioral approach. The activities are tailored to the position in question and the pre-defined key competencies. At the conclusion of the assessment, a report is produced highlighting strengths, areas for improvement, and a development plan for the future role. The report is provided to both the client and the candidate. Some companies conduct assessment centers internally, while others use external consulting firms. (Artigaud, AUBIGNAC , & Vindevogel, 2011)

1.3.5. Tools for Competency Evaluation :

HR professionals today have access to a range of innovative tools to facilitate skills assessment:

A. Competency Frameworks and Assessment Grids

Competency frameworks define the skills, knowledge, and behaviors required for each job position, while assessment grids are used to translate these competencies into measurable indicators.

These tools are essential for ensuring consistency in evaluation, as they allow HR managers to clearly define performance expectations and objectively assess employees against standardized criteria. (Dessler, 2020)

B. Psychometric and Skills Tests

Psychometric and skills tests are used to evaluate cognitive abilities, technical knowledge, and job-related competencies. They are widely applied in HR practices to ensure objective assessment and reduce subjectivity in decision-making.

These tools help organizations identify employees' strengths, weaknesses, and development needs, which supports better recruitment and training decisions (Noe, 2020).

C. Digital Assessment Systems

Digital assessment systems include online platforms that allow organizations to evaluate competencies through tests, simulations, and structured questionnaires. These systems improve efficiency and enable large-scale assessments within organizations (Noe, 2020).

D. Human Resource Information Systems (HRIS)

HRIS are integrated systems used to manage employee data and support competency evaluation processes. They play a key role in linking individual skills with organizational needs and supporting strategic HR planning.

- Storing employee skills and qualifications
- Tracking competency development over time
- Identifying skill gaps
- Supporting workforce planning (Dessler, 2020)

E. Skills Mapping Systems

Skills mapping is a tool used to compare required job competencies with the existing skills of employees within the organization. It helps HR managers identify gaps and design appropriate development strategies (Armstrong, 2014).

F. Learning Management Systems (LMS)

Learning Management Systems are digital tools used to deliver training systems and monitor employee learning progress. They support continuous competency development and ensure alignment between training activities and organizational needs (Noe, 2020).

Overall, competency evaluation tools play a crucial role in Human Resource Management by providing reliable and structured information about employee skills. They help organizations identify competency gaps, improve training strategies, and enhance overall performance.

Table 2: Distinction between Competency Evaluation Methods and Tools

Criteria	Methods of Competency Evaluation	Tools of Competency Evaluation
Definition	Approaches used to assess employee competencies and performance	Instruments and systems used to support and implement the evaluation process
Purpose	To evaluate how competencies are demonstrated in real situations	To collect, measure, and analyze data related to competencies
Focus	Behavioral and procedural aspects of evaluation	Technical and organizational support of evaluation
Nature	Conceptual and human-centered	Technical, digital, and structural
Examples	Peer evaluation, self-evaluation, 360-degree evaluation, interviews, assessment centers	HRIS, assessment grids, skills mapping, LMS, psychometric tests, digital platforms
Output	Qualitative judgment and performance appraisal	Quantitative data, reports, indicators, dashboards

Source : Elaborated by the authors based on (Armstrong, 2014) (Dessler, 2020) (Noe, 2020)

The table distinguishes between competency assessment methods and assessment tools in terms of their definition, purpose, nature, and examples. This distinction helps clarify the difference between the methodological framework (methods) and the technical instruments (tools) used in the evaluation process.

1.3.6. Problems and Errors in Evaluation, and Conditions for Success :

1.3.6.1. Problems :

- **Problems in Evaluation :**

In some cases, employees perceive an evaluation program as a tool of manipulation and control used by evaluators. This perception is particularly common when the evaluation is conducted by the immediate supervisor, who may be seen as merely observing subordinates' behavior, making it difficult for them to fully assume both roles of judge and advisor.

- **Problems Related to Evaluation Methods :**

According to Eric Compoy, no evaluation technique fully achieves all the intended objectives. Some approaches may be poorly suited, especially for assessing employees' true potential. These techniques are often "defective or even inappropriate for the method's purpose. "Some failures in evaluation systems can also be attributed to using methods that do not fit the organization's specific context. Sometimes, companies adopt widely used methods simply because of their popularity, rather than their suitability. It is preferable to select an evaluation method that genuinely meets the organization's requirements.

- **Problems Related to Psychological Involvement of Employees :**

Performance evaluations can be depersonalized, where the employee is poorly informed. In many cases, employees are merely asked to sign an evaluation report without prior explanation. Evaluators should clearly identify areas for improvement and methods to address them before finalizing the report.

- **Problems Related to Evaluators :**

When management is insufficiently involved in the evaluation process, its effectiveness may decline. Some managers perceive the evaluation process as unnecessary or a waste of time, causing discomfort when they must justify their ratings. Differences of opinion may also arise between evaluator and employee regarding goals, criteria, or performance outcomes. HR is responsible for reminding both parties of proper evaluation procedures.

1.3.6.2. Errors to Avoid in Skills Evaluation :

- **Judgment Errors :**

Incorrect judgment occurs when an evaluator disregards principles of objectivity and ethics. These errors, often called "biases," appear when evaluation criteria are undefined. Biases may be explicit or subtle and can be influenced by emotions or a lack of understanding of information processing by evaluators. Gérard-Philippe emphasizes that supervisors are never completely immune to errors in judgment. Supervisors should avoid pitting employees against each other and focus on evaluating work performance against predetermined standards. (HOUACINE & SI LARBI, 2018)

- **Types of Errors :**

A. Central Tendency Error :

Occurs when an evaluator consistently rates employees along a single trend: pessimistic (low scores), optimistic (high scores), or neutral (average scores). Causes may include evaluator inexperience, limited analysis time, or insufficient knowledge of employees.

B. Halo Effect :

The halo effect arises when an evaluator's overall rating is influenced by one specific attribute of the employee. Positive indicators may lead to overestimation of overall performance, while negative indicators may result in underestimation. Using a detailed evaluation matrix with observable and measurable criteria can minimize this effect.

C. Similarity Bias (Mirror Effect) :

Evaluators tend to rate more favorably those who share similar values, interests, or personality traits. If neutrality cannot be guaranteed, the evaluation may be delegated to another supervisor.

D. Prejudices :

Evaluations may be influenced by prejudices. For example, managers may doubt women's responsibility or oppose their career advancement, leading to biased assessments.

E. Leniency Error :

Leniency occurs when evaluators consistently assign high ratings to all employees, either to show appreciation or to appear attentive. This may also reflect discomfort in the evaluator's role or hesitation to make difficult judgments. (HOUACINE & SI LARBI, 2018)

1.3.6.3. Conditions for Successful Evaluation :

To ensure an effective and well-received evaluation, organizations must properly implement the process and follow up on results. Otherwise, evaluations may be seen as mere administrative formalities.

Employee performance is strongly influenced by recognition and appreciation in their role. An effective evaluation program is not limited to monetary rewards. Many studies indicate that, particularly in public organizations, evaluation systems aim to identify training needs, improve internal communication, and enhance employee motivation. (HOUACINE & SI LARBI, 2018)

2. Foundations of Training and training Systems :

2.1. Training :

Organizations today face constant change, making training a crucial tool for preparing employees to meet new challenges. It shapes competencies, strengthens performance, and helps align individual skills with strategic objectives.

2.1.1. Concept of Training and Professional Training :

Training is a structured process that enables individuals to adapt to current and future organizational requirements. Meignant considers training as a factor of adaptation and adjustment that also contributes to reconciling social and economic interests by improving

employee satisfaction and organizational performance. In the same line, Raymond Vatiez defines training as a set of actions that allow individuals and groups to perform effectively their current or future roles within the organization.

Jean-Pierre Citeau also emphasizes that training consists of pedagogical measures designed to help employees adapt to organizational and structural changes resulting from professional evolution (KHANTACHE & LEHOUCHE, 2022).

Professional training refers more specifically to continuous learning aimed at developing employees' competencies. According to Dolan Shimon, it provides the necessary knowledge and skills to perform work effectively. Louart adds that it helps strengthen technical abilities while supporting personal development and career progression. Similarly, Peretti highlights its role in adapting employees to technological and organizational changes (KHANTACHE & LEHOUCHE, 2022).

2.1.2. Objectives of Training :

- Training is a key process that aims to develop employees' skills, improve their performance, and help organizations adapt to environmental changes (Werner & DeSimone, 2012)
- Training aims to improve employees' knowledge, skills, and abilities in order to enhance their job performance and ensure effective accomplishment of work tasks within the organization
- It enables employees to adapt to changes in the work environment, including technological developments and organizational restructuring that require new competencies
- Training contributes to improving organizational effectiveness by strengthening employee performance and reducing skill gaps between required and actual competencies
- It supports employee development by increasing motivation, engagement, and job satisfaction through continuous learning opportunities
- Training also prepares employees for future roles and responsibilities by developing competencies that support career progression and internal mobility

2.1.3.Types of Training:

Training in organizations can take different forms depending on employees' needs and organizational goals. Choosing the right type of training is important because it affects how effective the training will be (Cascio, 2019).

A. Orientation Training:

Orientation training is given to new employees when they join the organization. It helps them understand the workplace, rules, and general working environment. This type of training makes it easier for new employees to adapt and feel comfortable in their new job.

B. On-the-Job Training:

On-the-job training happens directly at work. Employees learn by doing real tasks with the help of experienced workers or supervisors. It is practical and helps employees learn skills that they can use immediately in their job.

C. Off-the-Job Training:

Off-the-job training takes place outside the workplace, such as in training centers or classrooms. It is usually used to learn theory or develop skills that need focused learning without work pressure.

D. Individual Training:

Individual training is designed for one employee based on his or her specific needs. It focuses on improving particular skills or filling specific gaps in performance.

E. Group Training :

Group training is done with several employees at the same time. It helps participants learn from each other and improves teamwork and communication.

F. Formal and Informal Training

Formal training is organized and planned in advance with clear objectives and structure. Informal training happens naturally at work through experience, observation, and interaction with colleagues.

2.2.Training System :

This section presents the concept of the training system and highlights its main aspects.

2.2.1. Definition of training system :

A “dispositif” refers to “the set of forces put in place to accomplish a given mission.” In the context of training, a training system can therefore be understood as the collection of resources and measures established to train an individual. (BEBISSEMEYE, 2022)

Bourdet and Leroux explain that the concept of “dispositif” has been used in the field of educational and training sciences since the 1970s. Originally of technical origin (e.g., production systems), the term is based on a systemic vision of training. It stems from engineering, where it denotes the set of criteria considered to carry out an action. Guy Le Boterf, cited by Bourdet and Leroux, defines it as: “a coherent and organized set of elements (methods, tools, procedures, routines, principles of action) structured around a specific goal.” (Bourdet & Leroux, 2009)

Thus, the training system constitutes a fundamental prerequisite that stakeholders must carefully define to ensure training effectiveness. When this system is perceived as ineffective, field practices may even inhibit the professional engagement of participants. (BEBISSEMEYE, 2022)

2.2.2. Components of the Professional Training System :

The components of a professional training system represent the driving forces that enable the system to achieve its objectives. (Belkhiati & Belaïd , 2022)

A. Inputs:

Inputs are the elements subjected to specific processes to transform them from their original state into a form that meets the system’s needs and acquires certain characteristics. They are divided into:

- Human inputs : the individuals participating in the training.
- Material inputs :physical resources used in the training process.
- Intellectual inputs :information, data, research, and scientific theories.
- Technological inputs : tools and technologies supporting the training process.

B. Processes:

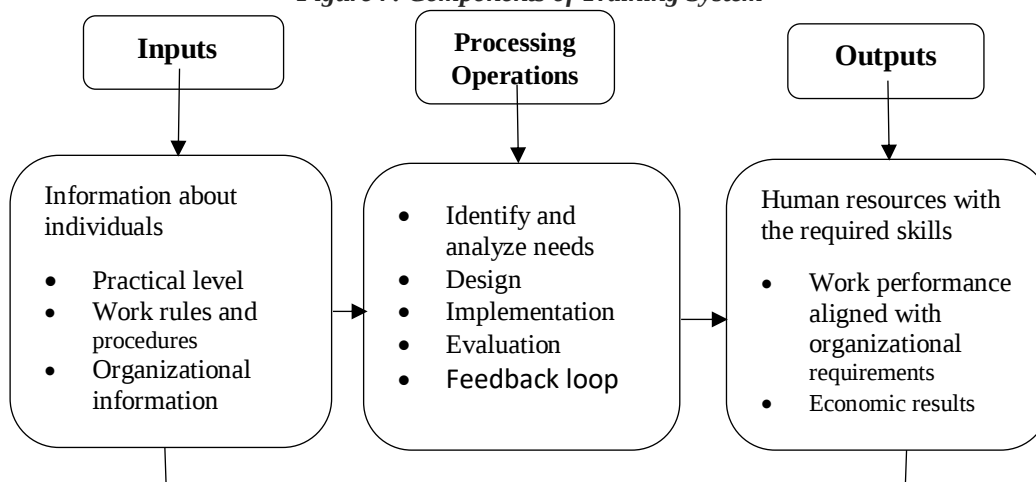
Processes are the operations and transformations applied to the inputs in order to add new characteristics. They concern the training process itself and the practical development of trainees, enabling them to acquire the desired skills and attributes.

C. Outputs:

Outputs represent the results achieved through the processes (skills, abilities acquired by trainees). They reflect the value that the system contributes to its surrounding environment. These outputs can take various forms (goods or services) and are classified as follows:

- Human outputs: the trainees themselves after completing the training process, having acquired new skills and attributes.
- Material outputs: tangible results produced by the trainees after acquiring new competencies, such as increased productivity through cost reduction, time and effort efficiency, and improved performance levels.
- Intellectual outputs: the cognitive and psychological development of trainees, which also impacts material outcomes. These outputs include enhanced knowledge, increased awareness, greater loyalty to their organizations, and improved interpersonal harmony.

Figure 7: Components of Training System



Source :prepared by the authors based on (Al-Salmi, 2001)

The figure presents the components of the training system in terms of inputs, processes, and outputs (human, material, and intellectual). This representation helps explain how training activities are transformed into tangible outcomes that contribute to organizational performance.

D. Objectives:

Objectives are the intended outcomes of the training process, aiming to fulfill both the individual's and the organization's goals.

E. Environment:

The environment consists of the conditions surrounding the system that both affect and are affected by it. The training system operates within a specific environment or context that influences its functioning.

2.2.3 Main Features of Training Systems :

- **Goal-oriented nature:**

Training systems are developed to meet both organizational goals and employees' competency needs, ensuring consistency between training activities and the strategic direction of the organization (Salas, Tannenbaum, Kraiger, & Smith-Jentsch, 2012)

- **Structured organization:**

They operate through a systematic sequence that includes training needs analysis, program design, implementation, and evaluation, which guarantees coherence and proper organization of the training process (Aguinis & Kraiger, Benefits of training and development for individuals and teams, organizations, and society, 2009)

- **Adaptability:**

Training systems are designed to be flexible, allowing adjustments in response to changes in technology, job requirements, and organizational strategies, in order to maintain their relevance (Noe, 2020)

- **Evaluation orientation:**

They incorporate assessment mechanisms that help measure training effectiveness through performance indicators and feedback, enabling organizations to evaluate learning outcomes and impact (Jr, Bennett, Edens, & Bell, 2003).

- **Learner-centered approach:**

Training systems prioritize employee involvement, engagement, and individual learning needs to enhance the acquisition and effective transfer of competencies in the workplace . (Salas, Tannenbaum, Kraiger, & Smith-Jentsch, 2012)

2.2.4. Training Engineering:

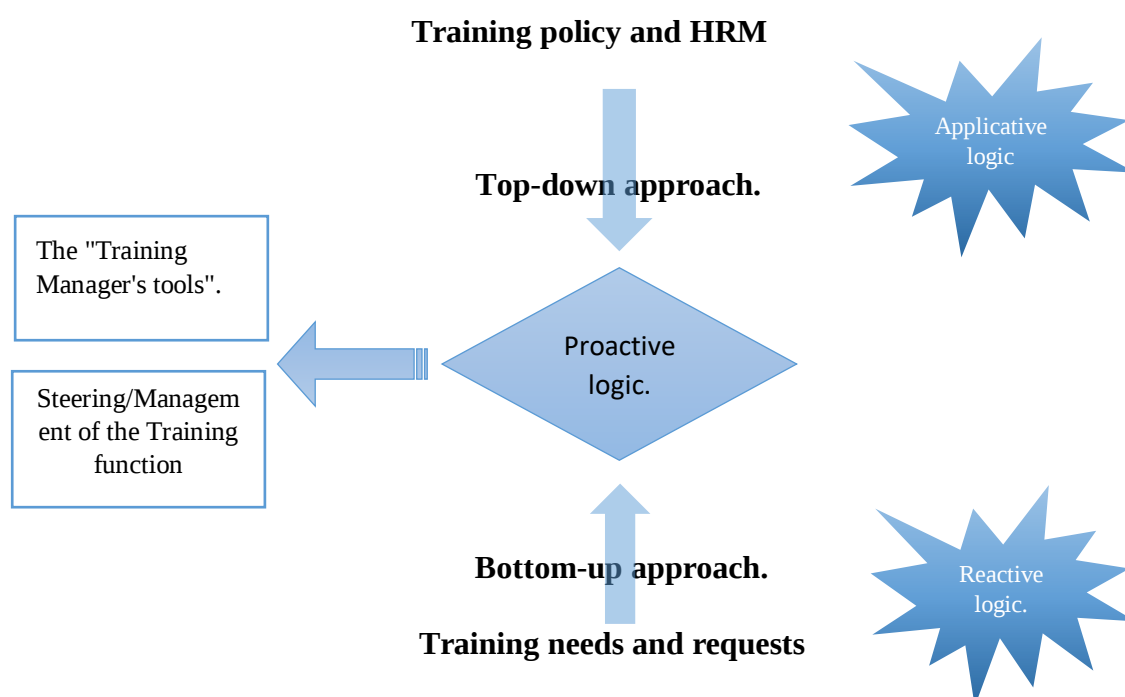
Training engineering can be considered as a structured and organized process that aims to design, implement, and evaluate training activities in line with organizational needs and

human resource development objectives. This process is generally based on four main phases: analysis, design, implementation, and evaluation (ARDOUIN, 2013).

A. Analysis Phase :

- **Analysis of training needs:** This phase aims to identify the gap between employees' current competencies and the competencies required for effective job performance. It relies on analyzing organizational objectives, job requirements, and performance levels in order to determine real training needs .
- **Identification of target population:** At this stage, the organization identifies the employees concerned by the training. This is done by examining their positions, skill levels, and professional profiles to ensure that the training is adapted to their needs .
- **Definition of training objectives:** Based on the identified needs, clear and measurable objectives are defined. These objectives specify the competencies that should be developed or improved through the training process .

Figure 8: The training plan



Source : adapted by the authors from (ARDOUIN, 2013)

The figure details the training plan, starting with the analysis of training needs and extending to the identification of the target audience and the formulation of training objectives. These steps constitute the methodological foundation for designing any effective training program.

B. Design Phase :

- **Development of training content:** This step consists of organizing the knowledge, skills, and behaviors that will be delivered during the training, in accordance with the defined objectives .
- **Selection of pedagogical methods:** Appropriate learning methods are chosen depending on the type of competencies to be developed, in order to ensure effective learning and better engagement of participants .
- **Structuring of training program:** The training program is structured into organized modules with a logical sequence, which helps learners progress step by step in acquiring competencies.

C. Implementation Phase :

- **Organization of training activities:** This phase involves preparing and organizing all logistical aspects of the training, such as scheduling, resources, and training conditions .
- **Delivery of training sessions:** Training is carried out through structured sessions where content is presented in an interactive way to facilitate understanding and participation .
- **Supervision of learners:** Participants are supported throughout the training process to maintain their engagement and ensure effective learning .

D. Evaluation Phase :

- **Evaluation of learning outcomes:** This step measures the extent to which learners have achieved the training objectives and acquired the expected competencies.
- **Assessment of training effectiveness:** It evaluates the impact of training on employee performance and on the organization as a whole.
- **Continuous improvement:** Feedback collected from participants and stakeholders is used to improve future training systems and enhance their effectiveness.

2.2.5. Typology of Training systems (Internal, External, Hybrid) :

The organization of training activities within companies takes diverse forms, depending on the objectives pursued, available resources, and structural constraints. To address challenges such as skills development, career transitions, or adaptation to sectoral changes, various types of training arrangements are utilized. The main types are internal, external, and hybrid arrangements. Each has specific characteristics, implementation modalities, and distinct organizational and pedagogical implications. (Lhassen, 2025)

- **Internal training :**

A. Definition:

Internal training refers to systems designed, organized, and delivered by the company itself. These systems often take place on company premises and are directly linked to employees' professional activities.

B. Main Characteristics:

- Tailor-made design according to internal expectations and constraints.
- Trainers drawn from within the company, such as department managers or experienced employees.
- Various modalities: classroom sessions, individual coaching, practical workshops.
- Direct transmission of company values and reinforcement of organizational belonging.

C. Implications:

The use of internal arrangements reflects a desire to control content, reduce the costs of external training, and fully integrate the formative dimension into internal dynamics.

- **External training :**

A. Definition:

External training systems are designed and implemented by actors outside the company, such as training centers, specialized firms, or certification bodies. They can be funded directly by the company or through individual training mechanisms.

B. Main Characteristics:

- Access to specialized expertise not available internally.
- Systems often structured around standardized or certified curricula.
- Various formats: in-person sessions, distance learning, online courses.
- Opportunity to gain exposure to other sectors or professions.

C. Implications:

Outsourcing training exposes employees to diverse methodologies but may also create a partial disconnect from the company's specific needs.

- **Hybrid (or Mixed) training :**

A. Definition:

Hybrid training combines multiple learning modalities, often integrating face-to-face sessions with distance learning. These arrangements leverage digital tools to enrich the training experience while maintaining human interaction.

B. Main Characteristics:

- Alternation between synchronous activities (virtual classes, online meetings) and asynchronous activities (videos, interactive modules).
- Use of technological platforms to facilitate content tracking and knowledge capitalization.
- Flexibility for participants to adjust the learning pace according to their availability.
- Alignment with operational objectives while incorporating external resources.

C. Considerations:

Hybrid approaches can be risky if they rely on an excessive number of tools or if there is poor coordination between modalities. Coherence between pedagogical objectives, content, and formats is essential to the effectiveness and relevance of these arrangements.

Table 3: :typology of training system

Type of Training System	Definition	Key Characteristics
Internal	Training systems designed and delivered internally by the company	Adapted to internal needs
		Internal trainers
		Reinforces company culture
External	Training provided by specialized external organizations	External expertise
		Standardized or certified programs
		Access to new methods
Hybrid	Training combining face-to-face and digital modalities, both internal and external	Synchronous/asynchronous mix
		Technological support
		Flexible learning pace

Source : prepared by the authors according to (Lhassen, 2025)

The table classifies training systems into three categories: internal, external, and hybrid, while outlining the definition and characteristics of each type. This classification highlights the different options available to organizations when designing their training programs.

2.3. Effectiveness of Training Systems :

This section presents the concept of training system effectiveness and explains its significance in organizational contexts.

2.3.1. Effectiveness:

Effectiveness refers to the extent to which an organization achieves its intended objectives and expected outcomes. It focuses on goal attainment, meaning the degree to which planned objectives are reached successfully regardless of the resources used. (Aguinis, 2013)

• Effectiveness of Training Systems

The effectiveness of training systems refers to the extent to which a training system is capable of developing employees' competencies, knowledge, and skills in alignment with organizational objectives and human resource development needs. It reflects how training contributes to improving human capital and supporting organizational performance through structured development processes.

2.3.2. Indicators of the Effectiveness of Training Systems :

To evaluate the effectiveness of training systems, it is necessary to rely on a set of indicators that reflect both individual learning outcomes and organizational performance improvements. These indicators are widely discussed in the training and human resource development literature.

• Learning outcomes and competency development:

One of the main indicators of training effectiveness is the extent to which participants develop new knowledge, skills, and competencies after the training program. This reflects the immediate learning impact of the training intervention (Baldwin & Ford, 1988).

• Transfer of training to the workplace:

Effectiveness is reflected in the ability of employees to apply what they have learned in real job situations (Baldwin & Ford, 1988). The transfer of training is considered a critical factor in determining whether training leads to actual performance improvement. (Burke & Hutchins, 2007)

• Trainee satisfaction:

Participants' reactions to the training program, including their satisfaction with content, trainers, and methods, are considered an important indirect indicator of training effectiveness,

as they influence motivation and engagement in learning . (Alliger, Tannenbaum, Bennett, H. Traver, & Shotland, 1997)

- **Organizational performance outcomes:**

Training effectiveness can also be assessed through its impact on organizational results such as productivity, service quality, efficiency, and achievement of strategic goals . (Swanson, 2001)

- **Overall evaluation of training impact:**

A comprehensive assessment of training effectiveness requires combining individual-level indicators such as learning, satisfaction, and transfer (Kraiger, Ford, & Salas, 1993) with organizational-level outcomes (Swanson, 2001) in order to obtain a global view of training system performance.

2.3.3. Models for Evaluating Training Systems :

For any trainer, evaluation represents the interaction between self-perception, others' perception, and what actually occurred, which can be assessed through objective indicators. Many factors influence the success of a training activity, including group dynamics, intercultural learning, conflicts, and how the training theme is explored. Each element can significantly impact the outcome.

In any evaluation strategy, the key question is: what should be evaluated? The answer depends on the type of training, the organization(s) involved, and the evaluation objectives. Information collected can be classified into categories or levels and analyzed using various evaluation models. There is no single universally accepted approach. The following table presents four commonly used evaluation models.

An Evaluation Model in Practice :

The Four-Level Training Evaluation Model by Kirkpatrick :

The relationship between the trainer's perception, the participants' perception, and the actual results is reflected in training evaluation. Conflicts, intercultural learning, group dynamics, and information delivery are all important for success. What is pertinent to the training kind, organization, and goals should be the main focus of evaluation.

Kirkpatrick's methodology uses four levels to evaluate training:

- **Reaction:** Uses forms or feedback to gauge participants' views, engagement, and level of satisfaction. gives preliminary information but might not accurately represent behavior or learning.
- **Learning:** Evaluates changes in knowledge, abilities, and attitudes. Tests are used in formal settings; workshops, role-plays, and simulations are used in informal adolescent activities.
- **Behavior:** Assesses how well knowledge is used in practical situations, frequently using follow-up tests. Direct observation of behavioral changes may be challenging.
- **Results:** Evaluates how behavioral change affects the organization. Isolating training effects from other variables and distinguishing between collective and individual impact are among the limitations.

This approach provides a useful framework for assessing the efficacy of training, especially in systems for professional or adolescent development. (Knoch, Klocker, & Manevski, 2022)

Table 4: model of Training Evaluation

Model	Training Evaluation Criteria
Kirkpatrick Model	Four Levels: 1. Reaction 2. Learning 3. Behavior 4. Results
CIPP Model (Context, Input, Process, Product)	Four Levels: 1. Context Evaluation 2. Input Evaluation 3. Process Evaluation 4. Product Evaluation (Results)
Brinkerhoff Model	Six Levels: 1. Needs Assessment 2. Program Design 3. Program Implementation 4. Immediate Results 5. Intermediate Results (Utilization) 6. Impact and Value
Systemic Approach (Bushnell)	Four Levels: 1. Input 2. Process 3. Output 4. Results

Source: prepared by the authors according to (Knoch, Klocker, & Manevski, 2022)

The table presents the main training evaluation models (Kirkpatrick, CIPP, Brinkerhoff, and the Systems Approach), along with the criteria associated with each model. This comparative overview provides a theoretical framework for selecting the most appropriate model to assess training effectiveness.

2.3.4.Factors Influencing the Effectiveness of Training Systems :

Training systems effectiveness is influenced by a set of interrelated factors that determine the success of training systems and their impact on both individual and organizational

performance. These factors are associated with trainees, training design, and the organizational environment in which training is implemented (Goldstein & Ford, 2002)

- Trainee characteristics: motivation, abilities, and readiness to learn
- Training design and content: clarity of objectives, relevance of content, and appropriate methods
- Work environment: managerial support and opportunities to apply acquired skills
- Trainer competence: experience, qualifications, and pedagogical skills
- Evaluation and feedback: assessment methods and continuous improvement mechanisms

Box 2 : Competence evaluation in Training Systems (Conceptual Framework)

This section examines the essential features of competence evaluation in training systems, highlighting their impact on the effectiveness of training interventions.

1. Role of Pre-Training Evaluation in Enhancing Training Effectiveness :

Pre-training evaluation is an important step because it helps the organization identify the real training needs of employees. It is mainly based on comparing the competencies employees already have with those required for their jobs. In this context, pre-training evaluation contributes to effectiveness through:

- **Targeting real competency gaps:** it helps focus training on actual weaknesses
- **Avoiding irrelevant training:** it reduces unnecessary costs and ineffective programs
- **Improving alignment:** it links training objectives with job requirements

So, the quality of needs assessment has a direct impact on how relevant and effective training systems are (Goldstein & Ford, 2002).

2. Role of Ongoing Evaluation in Regulating Training Effectiveness:

Ongoing evaluation, also called formative evaluation, plays an important role during the training process. It helps monitor learners' progress and improve the way training is delivered. Formative evaluation is particularly useful for regulating learning activities and adapting teaching methods during training, which helps improve learning outcomes (Perrenoud, 1998). This type of evaluation improves effectiveness through:

- **Monitoring learners' progress:** it helps follow how competencies are developing
- **Identifying difficulties:** it allows the trainer to detect problems during learning
- **Providing feedback:** it helps learners understand their mistakes and improve
- **Adapting training methods:** it allows changes in content or teaching style when needed

This means that ongoing evaluation makes training more flexible and helps achieve better results.

3. Role of Post-Training Evaluation in Measuring Effectiveness:

Post-training evaluation is used to check whether the objectives of the training have been achieved and whether employees have really developed the expected competencies. Training effectiveness can be better understood by evaluating outcomes such as learning, behavior change, and organizational results, which are central elements in training evaluation models

(Kirkpatrick & Kirkpatrick, 2006). In this case, post-training evaluation contributes to effectiveness by:

- **Measuring learning outcomes:** it checks if competencies were acquired
- **Assessing transfer to the workplace:** it evaluates if employees apply what they learned
- **Improving future training programs:** it helps identify what worked and what did not
- **Supporting decision-making:** it helps the organization decide about future training investments

So, evaluation after training gives clear information about how effective the training system really is.

4. Contribution of Evaluation Methods and Tools to Training Effectiveness:

The effectiveness of training systems also depends on the quality of the evaluation methods and tools used. The use of reliable and valid evaluation tools allows organizations to obtain accurate information about competency levels and to support objective decision-making in training management (Aguinis, 2013). In this perspective, evaluation methods and tools contribute to effectiveness through:

- **Ensuring measurement accuracy:** they provide reliable information about competencies
- **Supporting objective decisions:** they reduce subjectivity in evaluation
- **Facilitating performance comparison:** they allow comparison before and after training
- **Enhancing training design:** they help improve systems based on real data

Therefore, choosing appropriate evaluation tools is essential for improving training effectiveness.

5. Contribution of Evaluation to Monitoring and Continuous Improvement :

Competency evaluation also helps organizations improve their training systems over time. By analyzing evaluation results, organizations can identify what needs to be improved and make better decisions. Continuous evaluation and feedback processes are essential for maintaining training effectiveness and improving organizational performance, especially in dynamic work environments (Salas, Tannenbaum, Kraiger, & Smith-Jentsch, 2012). This contribution can be seen through:

- Tracking competency development over time
- Identifying areas for improvement
- Optimizing resource allocation and supporting strategic HR decisions

Conclusion of Chapter 1 :

Through the review of existing literature and the analysis of the fundamental concepts related to competency evaluation and the effectiveness of training systems, this study enabled us to develop a deeper understanding of the subject. The articulation between theoretical and practical aspects helped identify the main mechanisms through which competency evaluation contributes to improving the quality, relevance, and effectiveness of training systems within organizations.

Furthermore, this study provided a comprehensive overview of the different competency evaluation practices adopted within organizations, as well as the theoretical approaches used to assess training system effectiveness. It also highlighted the importance of ensuring coherence between employees' competency development, training needs, and organizational objectives in order to strengthen organizational performance and improve the effectiveness of human resource management practices.

CHAPTER 02 : METHODOLOGICAL FRAMEWORK AND EMPIRICAL EVIDENCE

Preamble :

After presenting the theoretical framework related to competency evaluation and the effectiveness of training programs, we now turn to the methodology adopted for conducting this study. This chapter aims to provide a structured presentation of the chosen methodological approach, ensuring a coherent and rigorous execution of the research.

First, we will outline the methodological framework, specifying the selected research approach, study design, and data collection tools employed. We will also describe the organizational context, briefly presenting the training institution where part of the study was conducted, to situate the research within a concrete and relevant environment.

Next, the second section will focus on the processing and analysis of the collected data, highlighting the methods used to examine the information and effectively address the research questions.

Section 01: Methodological and Empirical Evidence

Box 01: Methodological Framework

“Research methodology is a way to systematically solve the research problem. It may be understood as a science of studying how research is done scientifically.” (Kothari, 2004)

In this context, this section presents the research process as well as the adopted methodology, with a focus on the elements that ensure the reliability and validity of the results, which are essential to the quality of our work.

1. The Research Process :

“the research process refers to the wide range of interrelated and often overlapping activities involved in the planning and execution of research.” (Cohen, Morrison, & Manion, 2017)

In any scientific inquiry, the researcher must clearly identify and justify the chosen research method, ensuring it aligns with the conceptual framework and the study's philosophical assumptions (Creswell, Research Design Qualitative Quantitative and Mixed Methods Approaches, 2014). The research process is understood as a sequence of logically connected stages that guide the investigation from problem formulation to conclusions (Bryman & Bell, 2015). According to (Neuman, 2014), “the research process is a systematic series of steps used to collect and analyze information to increase understanding of a topic or issue.” This emphasizes that methodological decisions are grounded in epistemological positions, which shape how data are gathered, interpreted, and used to produce credible findings.

1.1. Research Epistemology :

Epistemology refers to the assumptions concerning the nature of human knowledge and how it is developed, that is, what can be considered valid and acceptable knowledge within a research context. These assumptions directly influence how data are collected, interpreted, and analyzed, shaping the formulation of research questions, the choice of research strategy, data collection methods, analytical techniques, and even the presentation and discussion of findings. (Lewis, Saunders, & Thornhill, 2023)

According to (Creswell, Research Design Qualitative Quantitative and Mixed Methods Approaches, 2014) research in management sciences is based on different epistemological positions, notably positivism, constructivism, and interpretivism. Positivism is an

epistemological position that advocates the application of the methods of the natural sciences to the study of social phenomena (Bryman & Bell, 2015). It is based on a scientific approach that aims to analyze observable and measurable facts objectively in order to establish general laws. In this context, existing theories allow the formulation of hypotheses, which are then subjected to empirical testing through the collection and analysis of quantitative data (Saunders, Lewis, & Thornhill, 2009).

In our study, which aims to analyze the impact of competency evaluation on the effectiveness of training programs, and which is part of an analytical approach, we adopt the positivist paradigm by relying on a pre-existing theoretical framework in order to formulate hypotheses. These are then subjected to empirical validation through the analysis of quantitative data. This approach makes it possible to obtain objective and generalizable results, thereby contributing to a better understanding of the role of competency evaluation in improving the effectiveness of training programs.

1.2. Research Approach :

According to (Babbie, 2013), positivist research is based on a deductive logic that seeks to test hypotheses through the collection and analysis of empirical data. It emphasizes objectivity, the use of quantitative methods, and the measurement of observable phenomena in order to produce reliable, valid, and generalizable findings.

Deductive reasoning is a logical research approach where investigation starts from a general theory and moves toward specific empirical observations to test hypotheses. According to (Neuman, 2014), “in deductive research, the researcher begins with a theory and tests it with empirical data.”

In the context of our study, we began by carefully reviewing the existing literature to gather relevant information from previous research. Subsequently, we collected data in the field to directly assess the situation under study. The analysis of these data enabled us to draw robust conclusions and propose appropriate recommendations to enhance the effectiveness of the studied systems.

1.3. Research Strategy (Research Design) :

The research design provides a structured framework that guides the collection and analysis of data (Walliman, 2011). It represents a logical plan linking the research objectives to the expected outcomes (Yin, 2018). Furthermore, it ensures coherence between the research

problem, the theoretical framework, the data collected, and the subsequent analysis. As such, the research design is considered an essential element of any empirical study.

“Research can be classified into several types according to the purpose of the research, such as exploratory, descriptive, explanatory, and experimental.” (Neuman, 2014)

Within the framework of our study, an explanatory approach was adopted to analyze the impact of competency evaluation on the effectiveness of training programs. This type of research allows for understanding the cause-and-effect relationships between competency assessment and the performance of training systems, without requiring direct manipulation of variables, which distinguishes it from experimental studies.

1.4. Research Time Horizon :

“Research can be conducted as cross-sectional or longitudinal in terms of the time frame for data collection.” (Cohen, Morrison, & Manion, 2017)

In the context of our study, a cross-sectional approach was adopted for data collection, allowing the analysis of the relationship between competency evaluation and the effectiveness of training systems at a specific point in time. This approach, aligned with a positivist perspective, is based on a single data collection over a short period, providing a snapshot of the situation under study. It also enables the examination of correlations between variables within a given sample (Bryman & Bell, 2015).

1.5. Data Collection Method :

According to (Kothari, 2004), there are several methods of data collection in research, including the case study method, the survey method, and the historical method. Each method is selected based on the objectives of the study and the nature of the information required.

The survey method involves collecting quantitative data from a sample in order to identify potential relationships between variables and to build explanatory models based on this data.

In this study, situated within the positivist paradigm, we have adopted a deductive approach and employed the survey method for data collection. Data are gathered using a cross-sectional perspective, which provides a snapshot of information regarding competencies and the effectiveness of training systems at a specific point in time. The study follows a quantitative methodology, relying on a questionnaire as the main data collection tool, and the collected data will subsequently be processed and analyzed statistically.

1.5.1. Questionnaire :

The questionnaire is a structured data collection tool consisting of a series of questions designed to gather the information necessary for analyzing relationships between variables and addressing the research objectives (Fink, 2013).

For the development of the questionnaire, we relied on existing instruments from the literature and adapted the items to fit the context of our study. This approach is commonly used in survey research to ensure the relevance and validity of measurement tools. (Mohamad , Yusoff, & Wan , 2021)

1.5.1.1. Questionnaire Structure :

The questionnaire used in this study is carefully structured in order to collect relevant data related to the research problem, which focuses on examining the impact of competency evaluation on the effectiveness of training systems.

In this context, the questionnaire was administered in paper format and in the French language to employees within the studied organization, with the aim of gathering their perceptions and assessments regarding competency evaluation practices and training systems. It is organized into three main sections: the first section is devoted to respondents' profiles, while the second and third sections address the study variables. The second section focuses on competency evaluation as the independent variable, whereas the third section examines the effectiveness of training systems as the dependent variable, as follows (Appendix A):

Respondent Profile :

The questionnaire begins with questions [Q1–Q5], which aim to identify the respondents' profiles based on their socio-professional characteristics. This section collects information related to gender, age, educational level, seniority, and job position.

Competency Evaluation :

This section represents the independent variable of the study. It aims to analyze competency evaluation practices within the organization. Respondents are asked to indicate their level of agreement with the following statements using a Likert scale. It is divided into four dimensions:

- **Competency Evaluation Process :**

This dimension examines the organization and structure of the competency evaluation process. Questions [Q6–Q11] address aspects such as regularity, formalization, planning, and systematic implementation of the evaluation.

- **Evaluation Criteria :**

This dimension analyzes the relevance and clarity of the criteria used to assess competencies. Questions [Q12–Q15] evaluate their alignment with job requirements and their level of understanding among employees.

- **Evaluation Methods and Tools :**

This dimension focuses on the methods and tools used in the evaluation process. Questions [Q16–Q19] assess their appropriateness, objectivity, and suitability to the professional context.

- **Limitations of Competency Evaluation :**

This dimension highlights the shortcomings and constraints related to competency evaluation. Questions [Q20–Q25] address issues such as lack of objectivity, limitations of the tools used, and the impact of the absence of evaluation on identifying training needs.

- **Effectiveness of Training Systems**

This section represents the dependent variable of the study. It aims to measure the impact of training systems on competency development and the improvement of professional performance.

Questions [Q26–Q30] focus on the ability of training systems to meet actual needs, develop competencies, facilitate their transfer to the workplace, and reduce competency gaps. Respondents express their level of agreement using a Likert scale.

In conclusion, this research is grounded in a positivist epistemological paradigm. It adopts a deductive approach and uses a survey as the primary research method. The study follows a quantitative approach, with data collected through a cross-sectional design, allowing information to be gathered at a specific point in time. The collected data will be statistically analyzed in order to test the research hypotheses.

1.5.2. Documentary Analysis :

Documentary analysis is a qualitative data collection method based on the examination and interpretation of existing documents relevant to the research topic in order to support and enrich the collected data (Bowen, 2009). In this study, documentary analysis was used to better understand training practices and competency-related activities within the organization.

The analysis was based on the following documents:

- Job description sheets
- Training plan
- Annual report of the organization

Box 02 : Empirical Evidence

1. Study Population :

The target population of this study consists of all employees of SONATRACH who have benefited from professional training systems. According to data provided by the Human Resources department, this population amounts to 400 individuals. These employees come from various sites and departments within the group and have participated in training systems aimed at developing technical, managerial, as well as health, safety, and environmental competencies.

This relatively homogeneous population, in terms of exposure to training, enables an effective analysis of employees' perceptions and the impact of the training systems implemented by SONATRACH.

2. Sampling Method :

We adopted a non-probability convenience sampling method, complemented by quota sampling based on socio-professional categories and geographical sites. This approach was chosen due to logistical constraints related to the dispersion of employees across the various SONATRACH complexes and their limited availability. The questionnaire was directly distributed to employees who had undergone training, with the support of the Human Resources department. This method is frequently used in studies on corporate training. (Salhi, 2015)

3. Sample Size :

To determine the sample size from a finite population of $N = 400$ employees, we used the corrected Cochran formula for finite populations, which is widely recommended in survey-based research in management sciences.

The basic formula for an infinite population is as follows :

$$n = \frac{N * P(1 - P)}{\left[(N - 1) \left(\frac{d^2}{Z^2} \right) \right] + p(1 - p)}$$

Where:

- $N = 400$ represents the total size of employees who have participated in training systems,
- $Z = 1.96$ corresponds to a 95% confidence level,
- $p = 0.5$ is the estimated proportion by default,
- $d = 0.05$ represents the margin of error set at 5%

To determine the appropriate sample size, Cochran's formula was initially applied for an infinite population using a confidence level of 95% ($Z = 1.96$), a margin of error of 5% ($d = 0.05$), and a proportion estimate of 0.5. The calculation yielded an initial sample size of 384 respondents. Since the target population was finite and consisted of 400 employees who had participated in training systems, the finite population correction formula was subsequently applied. The adjusted sample size was estimated at 196 respondents. Therefore, a minimum sample of 196 employees was considered sufficient to ensure the representativeness and reliability of the study findings.

4. Data Collection:

Questionnaire validity (pre-test) :

A pre-test of the questionnaire was conducted from April 8 to April 14, 2026, within the SONATRACH company, Transport by Pipeline (TRC) branch. The objective of this step was to assess the content validity of the questionnaire by checking the clarity of the questions, the understanding of the terms used, and the coherence of their sequence. This exploratory phase ensured the relevance of the data collection instrument in relation to the studied context. Based on the feedback obtained, several modifications and adjustments were made in order to improve the quality and reliability of the questionnaire before its final distribution.

Following the pre-test phase and the necessary adjustments, the final version of the questionnaire was distributed from April 18 to April 23, 2026. This stage aimed to collect data from the target population in order to achieve the objectives of the study and test the formulated hypotheses. A total of 135 responses were collected exclusively from employees of the SONATRACH TRC branch. This sample size was considered sufficient for statistical analysis, despite some constraints related to respondents' availability during the data collection period.

5. Treatment and Data Analysis :

In this study, the analysis of the collected data aims to provide answers to the research questions and to test the formulated hypotheses. In order to ensure the quality and reliability of the results, the data were carefully coded and structured before analysis. The statistical treatment was carried out using the Statistical Package for the Social Sciences (SPSS), which allows the application of appropriate analytical techniques according to the quantitative nature of the data and ensures an objective interpretation of the obtained results.

5.1. Data quality verification :

Before conducting the main analyses, a set of preliminary checks was carried out to ensure the consistency and reliability of the collected data. These controls aimed to identify any potential anomalies that could affect the quality of the results, particularly through reliability testing of the measurement scales, examination of missing values, and verification of the normality of data distribution. All these procedures were implemented as part of a rigorous approach to ensure the validity of the statistical analyses and to minimize potential interpretation bias.

5.2. Univariate analysis :

Descriptive analysis allows summarizing quantitative data and identifying their main characteristics through measures of central tendency and dispersion, providing an initial overview of the data and facilitating the interpretation of results and the identification of general trends .

5.3. Hypotheses analysis :

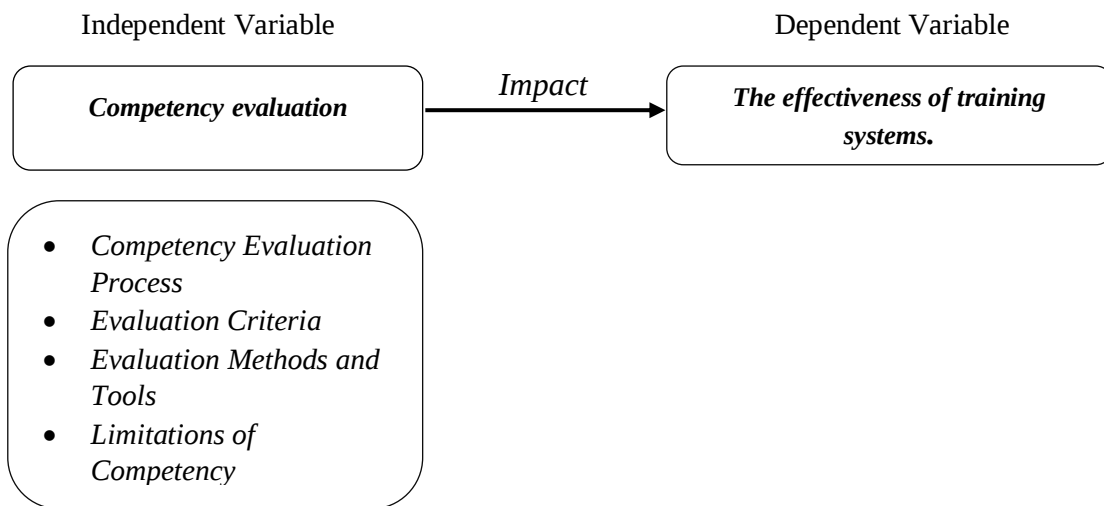
In the context of this study, hypothesis analysis was conducted to examine the impact of competency evaluation dimensions on the effectiveness of training systems using linear regression analysis. This method is used to determine the relationship between multiple independent variables and a dependent variable and to measure the extent of their influence.

The regression model is expressed as follows :

$$Y_i = \beta_0 + \beta_1 * X_1 + \beta_2 * X_2 + \beta_3 * X_3 + \beta_4 * X_4$$

Where :

- Y_i represents the effectiveness of training systems
- X_1, X_2, X_3, X_4 represent the dimensions of competency evaluation
- β_0 is the intercept
- $\beta_1, \beta_2, \beta_3, \beta_4$ are the estimated coefficients

Figure 9:research model

Source : prepared by the authors

The figure represents the research model of the study, illustrating the relationship between the independent variable (competency evaluation and its four dimensions) and the dependent variable (training system effectiveness). This model provides a visual representation of the study's hypotheses.

Section 02: Contextuel Framework

Sonatrach holds a central position in the national and international energy landscape. As a key pillar of the Algerian economy, it is distinguished by its integrated organization, covering all activities related to the exploration, production, transportation, and marketing of hydrocarbons.

1. Identity Profile of Sonatrach :

- **Name:** Sonatrach (National Company for Research, Production, Transport, Transformation, and Marketing of Hydrocarbons)
- **Slogan:** No official slogan
- **Legal Status:** State-owned company (Joint Stock Company – SPA)
- **Activities:** Exploration, production, transportation, refining, and marketing of hydrocarbons (oil and gas)
- **Capital:** 100% owned by the Algerian State
- **CEO (Chief Executive Officer):** Rachid Hachichi
- **Headquarters:** Hydra, Algiers, Algeria
- **Date of Establishment:** December 31, 1963
- **Network:** National and international presence (subsidiaries, partnerships, and industrial facilities in Algeria and abroad)

2. Presentation of SONATRACH :

SONATRACH, the leading hydrocarbons group in Africa, is the national oil and gas company and ranks among the most efficient in the world. For over 60 years, it has played a central role as the driving force of the national economy, thanks to its ability to operate as a fully integrated group across the entire hydrocarbons value chain.

The Group operates, either independently or in partnership, some of the largest fields in various regions of the Algerian Sahara, notably in Hassi Messaoud, Hassi R'Mel, Hassi Berkine, Ourhoud, Tin Fouyé Tabankort, Rhourde Nouss, In Salah, and In Amenas.

It also has an extensive pipeline transportation network across the country, stretching nearly 22,000 kilometers, as well as several oil ports that enable the loading and unloading of hydrocarbons.

Downstream, SONATRACH operates multiple industrial facilities, including refineries, petrochemical complexes, natural gas liquefaction plants, and LPG separation units.

2.1. Historical Overview of Sonatrach :

Established on December 31, 1963, Sonatrach is Algeria's national oil and gas company. It was initially responsible for the transportation and marketing of oil and gas within the context of post-independence state-building. Over time, its mandate expanded to include exploration, production, and the development of energy infrastructure, thereby consolidating its strategic role in the national economy.

A decisive milestone occurred in 1971 with the Nationalization of hydrocarbons in Algeria (1971), which strengthened the Algerian state's sovereignty over its energy resources and positioned the company as a central player in the oil and gas sector.

From the 1980s onward, the company was restructured into an integrated industrial group covering the entire value chain, from upstream activities to export. The 1990s were marked by the gradual opening of the sector to international partnerships as part of economic reforms, promoting technology transfer and the development of new projects.

Since the 2000s, Sonatrach has continued its modernization through the diversification of its activities, particularly in petrochemicals and liquefied natural gas, while strengthening its position in the international energy market (Ministry of Energy and Mines., 2024).

2.2. Activities of Sonatrach :

Sonatrach carries out activities across the entire hydrocarbons value chain, from exploration to marketing. This integrated approach highlights its key role in managing energy resources and its importance in both the national and international energy markets.

2.2.1. Exploration and Production (Upstream) :

Exploration and production activities represent the core business of Sonatrach. The company conducts oil and gas exploration operations across the national territory, particularly in Saharan basins such as Hassi Messaoud and Hassi R'Mel. It uses advanced geological and geophysical techniques to identify exploitable reserves, followed by drilling and extraction operations. This phase constitutes the primary source of the country's energy supply and forms the foundation of the entire hydrocarbons value chain. (SONATRACH, 2024)

2.2.2. Pipeline Transportation :

Sonatrach manages an extensive pipeline transportation network, considered one of the largest in Africa. This network ensures the transfer of crude oil and natural gas from southern production areas to processing centers and export terminals in the north. This mode of transport plays a crucial role in maintaining continuous energy flows, ensuring supply security, and reducing logistical costs compared to alternative transport methods. (Alnaft, 2023)

2.2.3. Refining and Processing :

Refining involves transforming crude oil into finished petroleum products such as gasoline, diesel, and LPG. Sonatrach operates several national refineries that help meet domestic energy demand and reduce dependence on imports. This activity is part of a broader strategy to enhance the value of natural resources by increasing the added value of hydrocarbons before commercialization. (Ministère de l'Énergie et des Mines, 2023)

2.2.4. Liquefaction and Export of Natural Gas (LNG) :

Sonatrach operates specialized industrial units for liquefying natural gas, converting it into liquid form (LNG) to facilitate storage and maritime transport. This strategic activity positions Algeria as a major supplier of natural gas on international markets, particularly in Europe and Asia, and contributes significantly to foreign currency revenues. (GIIGNL, 2023)

2.2.5. Petrochemicals :

The development of petrochemicals is a strategic priority for Sonatrach, focusing on transforming hydrocarbons into high value-added products such as plastics, fertilizers, and various industrial chemicals. This orientation supports economic diversification, reduces dependence on raw material exports, and promotes the growth of the manufacturing sector in Algeria (SONATRACH, 2024).

2.2.6. Marketing and International Trading :

Sonatrach is also responsible for the marketing of hydrocarbons on international markets through short-, medium-, and long-term contracts with foreign partners. The company plays an active role in negotiating export volumes and contractual terms, strengthening its position in the global energy market and ensuring stable foreign currency revenues for the national economy (OPEC, 2023).

3. Pipeline Transport Activity (TRC) :

The pipeline transport activity constitutes a key strategic link in SONATRACH's value chain. It ensures the transportation of liquid and gaseous hydrocarbons from production areas—mainly located in the southern regions of the country—to processing and refining centers, as well as export terminals situated in the north, while guaranteeing a continuous and reliable supply to the domestic energy market.

This activity relies on a highly developed infrastructure. According to official data, SONATRACH's pipeline transport network extends over approximately 21,190 kilometers, distributed across 22 transport systems (STC). It includes pipelines dedicated to the transportation of crude oil, natural gas, and liquefied petroleum gas (LPG). The network is also equipped with around 85 pumping and compression stations, as well as nearly 128 storage tanks, in addition to major oil port terminals located in Arzew, Skikda, and Béjaïa.

Furthermore, more than 53% of this network is dedicated to natural gas transport, reflecting the strategic importance of this resource in Algeria's exports. The overall gas transport capacity, particularly within the northern network, is estimated at approximately 138 billion cubic meters per year. A significant share of this volume is exported to Europe through major pipelines such as MEDGAZ pipeline. These capacities highlight SONATRACH's central role in securing energy flows and strengthening Algeria's position in the international energy market (Appendix B). (SONATRACH, 2025)

3.1. Organization of SONATRACH TRC :

The pipeline transport activity within SONATRACH is organized around the following core divisions:

- Operations Division, supported by key functional units such as Maintenance, Studies and Project Monitoring, Telecommunications, and Planning, Studies and Performance
- Health, Safety, and Environment (HSE) Department
- Finance and Human Resources Units

Other administrative and support functions, including Legal Affairs, IT, Internal Security, General Management, and advisory roles, are considered secondary for the purpose of this overview. (SONATRACH, 2025)

3.1.1. The Operations Division :

The Operations Division represents the core of the pipeline transport activity. Its main responsibilities include: (SOANTRACH , 2025)

- Managing and operating the hydrocarbon transport network
- Supervising real-time flow operations of Pipeline Transport Systems (PTS)
- Contributing to transport planning and monitoring its implementation
- Participating in maintenance systems for transport facilities
- Ensuring the availability and reliability of metering and control systems
- Conducting inspection and monitoring of pipeline systems

The Operations Division of SONATRACH is structured as follows:

- Liquid Flow Management Directorate
- Gas Flow Management Directorate
- Metering and Material Accounting Directorate
- Technical Directorate
- Regional Directorates
- Health, Safety, and Environment (HSE) Department

3 .1.2. Maintenance Division – SONATRACH TRC :

The Maintenance Division of SONATRACH is responsible for ensuring the integrity, reliability, and operational continuity of pipeline transport facilities. Its key missions include:

- Developing and implementing maintenance policies for pipeline installations
- Designing and executing maintenance plans in coordination with the Operations Division
- Managing pipeline and facility integrity plans
- Conducting technical diagnostics and overseeing repair operations

Organizational Structure:

- Technical Directorate
- Pipeline Integrity Directorate

- Regional Maintenance Directorates
- Health, Safety, and Environment (HSE) Unit

3.1.3. Studies and Project Monitoring Division – SONATRACH TRC :

The Studies and Project Monitoring Division of SONATRACH is responsible for planning, studying, and overseeing the execution of investment and development projects. Its main missions include:

- Developing annual and medium-term investment plans
- Conducting feasibility and network capacity studies
- Monitoring project implementation and optimizing costs and timelines
- Managing administrative and financial activities related to projects

Organizational Structure :

- Studies and Technologies Directorate
- Project Monitoring Directorate (covering both Hydrocarbon and Infrastructure projects)
- Administration and Finance Directorate
- Assistant

3.1.4. Telecommunications Directorats– SONATRACH TRC :

The Telecommunications Directorate oversees the operation, maintenance, and development of SONATRACH's communication and SCADA systems, ensuring reliable network performance and supporting pipeline operations

- Operating and maintaining SONATRACH's telecommunications network
- Coordinating maintenance and network development activities
- Managing SCADA systems for the transport network
- Overseeing investment projects in transmission and telephony
- Optimizing operating and maintenance costs

Organizational Structure :

- Operations and Maintenance Sub-Directorate

- Technical Sub-Directorate
- Procurement Department
- Administration and Finance Department

3.1.5. Planning, Studies, and Performance Directorate– SONATRACH TRC :

The Planning, Studies, and Performance Directorate oversees the strategic planning, performance management, and economic analysis of SONATRACH's pipeline transport activities, ensuring effective decision-making and alignment with corporate objectives

- Organizing and coordinating planning and performance management processes
- Developing and monitoring annual and medium-term transport and investment plans
- Conducting cost and economic studies for pipeline transport and investment projects
- Ensuring performance objectives are coherent and aligned with company strategies

Organizational Structure:

- Flow Coherence Department
- Investment Monitoring Department
- Performance Evaluation and Reporting Department
- Studies and Tariff Department

3.2. The Human Resources Directorate at SONATRACH TRC:

The Human Resources Directorate at SONATRACH TRC is a key administrative structure within the Activity, responsible for overseeing all matters related to personnel management. It operates in alignment with the overall policies of SONATRACH and supports the specific needs of pipeline transport operations.

3.2.1. Main Missions of the Human Resources Directorate:

The Human Resources Directorate is responsible for the following key missions:

- Contributing to the development of human resources management and development policies.
- Consolidating and arbitrating annual and multi-year human resources plans.

- Managing and developing employees' careers and competencies.
- Implementing and deploying the compensation and performance management systems.
- Interpreting and disseminating legal and regulatory texts and internal circulars.
- Supporting organizational units in HR management and conflict prevention.
- Identifying measures to improve working and living conditions.
- Managing administrative affairs of personnel and senior executives.
- Ensuring the implementation of occupational health policies.
- Reporting regularly to top management.

3.2.2. Main Missions of the Training Department:

- Implementing SONATRACH's training policy.
- Consolidating and monitoring training plans.
- Coordinating and supervising training programs.
- Preparing training specifications with concerned departments.
- Participating in defining training and specialization program modalities.
- Developing and applying training evaluation tools.
- Establishing partnerships with universities and institutions.
- Managing internships and apprenticeship programs.
- Reporting to management.

Conclusion of chapter 02 :

This chapter has presented in detail the research methodology adopted for this study on the impact of competency evaluation on the effectiveness of training systems within SONATRACH TRC. It outlined the overall methodological framework, described the data collection instrument and explained the statistical techniques used for data analysis. These methodological choices contribute to ensuring the rigor, reliability, and validity of the research process.

Furthermore, the presentation of the host organization provided an essential contextual background for the study, enabling a clearer understanding of the institutional and operational environment in which the research was conducted. Taken together, these methodological components establish a solid foundation for the next chapter, which will be devoted to the analysis and interpretation of the empirical findings in relation to the research questions and hypotheses.

Chapter 3: Results and Discussion

Preamble :

This chapter presents, analyzes, and interprets the findings derived from the empirical study conducted within the framework of this research. It aims to address the previously formulated research questions by confronting the collected data with the initial hypotheses, as well as with the insights drawn from the literature review.

The first section provides a descriptive analysis of the data, offering an overview of the respondents' characteristics and the main research variables. Subsequently, a bivariate analysis is carried out to examine the potential relationships between competency evaluation practices and the effectiveness of training programs. Finally, the results are discussed in light of the theoretical framework and prior empirical studies, in order to derive meaningful insights and enhance the understanding of the role of competency evaluation in improving training systems within the organization .

Section 01: Results

This section aims to present the results derived from the analysis of empirical data.

1. Verification of the quality of the collected data:

This section aims to examine the reliability of the test, assess missing and outlier values.

1.1. Reliability Test :

Before conducting any statistical analysis, it is important to ensure the validity and reliability of the measurement instruments used in the study. Reliability testing is a key procedure for assessing the internal consistency of scale items, particularly when they are intended to measure the same construct. In this context, Cronbach's alpha was employed to evaluate the reliability of the different dimensions under investigation, based on commonly accepted interpretation guidelines (Appendix C) :

Table 5: Cronbach's Alpha

Cronbach's Alpha	Interpretation
$\alpha \geq 0.9$	Excellent
$0.8 < \alpha < 0.9$	Good
$0.7 \leq \alpha < 0.8$	Acceptable
$0.6 \leq \alpha < 0.7$	Questionable
$0.5 \leq \alpha < 0.6$	Poor
$\alpha \leq 0.5$	Unacceptable

Source : (DeVellis, 2017)

The table presents the standard scale for interpreting Cronbach's Alpha coefficients, ranging from "Excellent" (≥ 0.90) to "Unacceptable" (≤ 0.50). This scale serves as a reference for assessing the reliability of the measurement instruments used in the field study.

To ensure the internal consistency of the various measurement scales used in this study, a reliability test was conducted using Cronbach's alpha coefficient.

Table 6: Cronbach's Alpha Reliability Statistics for All Items

Cronbach's Alpha	Number of items
0.867	25

Source : Author's own elaboration based on SPSS results

The table presents the overall Cronbach's Alpha result for all questionnaire items (0.867 for 25 items). This value indicates a high level of internal consistency and reliability of the instrument as a whole, thereby enhancing the credibility and trustworthiness of the study's findings.

1.2. Test for missing values :

According to the SPSS output of the missing values analysis, no variables contain any missing data. The software reports a 0% rate of missing values across all examined variables. This complete absence of missing data indicates a fully consistent and reliable dataset, allowing statistical analyses to be conducted without the need for imputation or case deletion. This strengthens the validity of the results by eliminating potential bias related to incomplete data. (Appendix D)

Table 7: Test for missing values

	N	Missing values frequency
Gender	135	0
Age	135	0
Educational Level	135	0
Length of Service	135	0
Position Held	135	0
Indep var	135	0
Dep var	135	0

Source : Author's own elaboration based on SPSS results

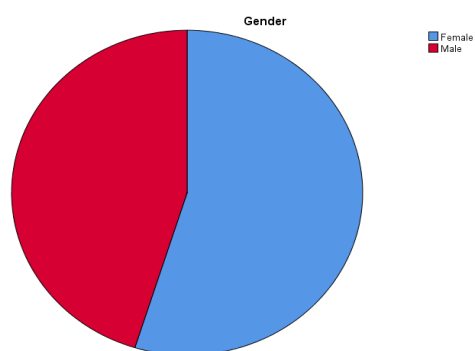
2. Respondents' profile:

2.1. Gender :

Table 8 : Gender statistics

Variable attributes	Frequencies	Percentages (%)
Female	74	54.8
Male	61	45.2

Source : Author's own elaboration based on SPSS results

Figure 10: Gender Distribution of Respondents

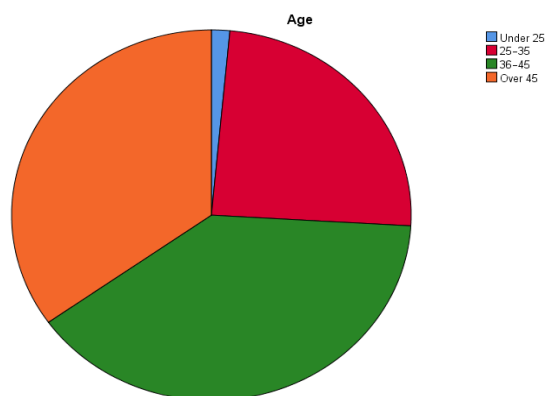
Source : Author's own elaboration based on SPSS results

2.2.Age :

Table 9: Age statistics

Variable attributes	Frequencies	Percentages (%)
Under 25	2	1.5
25-35	33	24.4
35-45	53	39.3
Over 45	47	34.8

Source : Author's own elaboration based on SPSS results

Figure 11 :Age distribution of respondents

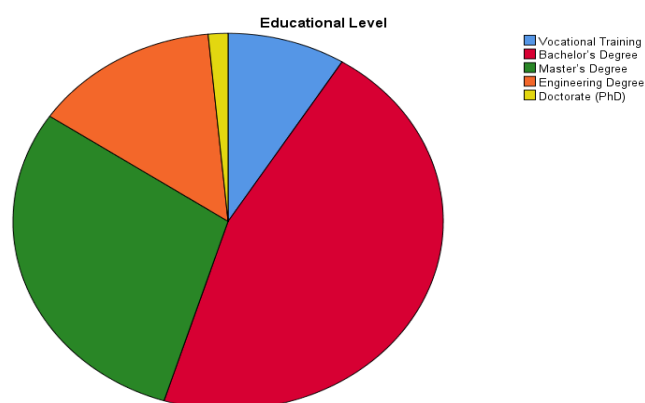
Source : Author's own elaboration based on SPSS results

2.3. Educational Level :

Table 10: Educational Level statistics

Variable attributes	Frequencies	Percentages (%)
Vocational training	12	8.9
Bachelor's degree	62	45.9
Master's degree	40	29.6
Engineering degree	19	14.1
Doctorate (PhD)	2	1.5

Source : Author's own elaboration based on SPSS results

Figure 12 : Educational level distribution of respondents

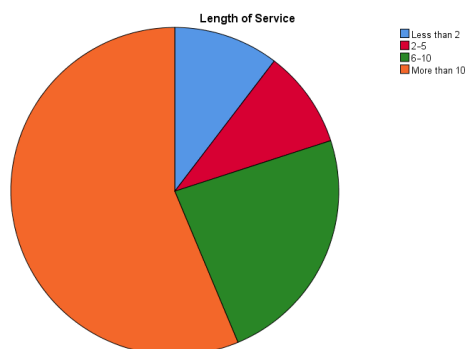
Source : Author's own elaboration based on SPSS results

2.4. Length of Service :

Table 11 :Length of Service statistics

Variable attributes	Frequencies	Percentages (%)
Less than 2y	14	10.4
2-5	13	9.6
6-10	32	23.7
More than 10y	76	56.3

Source : Author's own elaboration based on SPSS results

Figure 13 : Length of Service distribution of respondents

Source : Author's own elaboration based on SPSS results

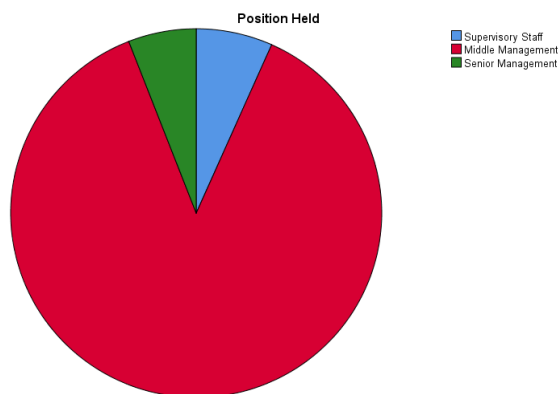
2.5. Position Held :

Table 12 :Position Held statistics

Variable attributes	Frequencies	Percentages (%)
Operational staff	0	0
Supervisor staff	9	6.7
Middle management	118	87.4
Senior management	8	5.9
Top management	0	0

Source : Author's own elaboration based on SPSS results

Figure 14: Position Held distribution of respondents



Source : elaborated by the authors based on spss results

According to the Tables and figures , the analysis of the respondents' sociodemographic profile shows that the sample is composed of 54.8% females and 45.2% males. Regarding age distribution, the majority of participants fall within the 35–45 age group (39.3%), followed by those over 45 (34.8%), 25–35 years (24.4%), and under 25 years (1.5%), indicating a relatively mature population. In terms of educational level, most respondents hold a Bachelor's degree (45.9%), followed by a Master's degree (29.6%), while the remaining participants have an engineering degree (14.1%), vocational training (8.9%), or a Doctorate (PhD) (1.5%), reflecting a high level of qualification within the sample. Concerning length of service, the majority of respondents have more than 10 years of experience (56.3%), followed by 6–10 years (23.7%), less than 2 years (10.4%), and 2–5 years (9.6%). As for position held, the sample is mainly composed of middle management staff (87.4%), followed by supervisory staff (6.7%) and senior management (5.9%), with no representation of operational staff or top management (Appendix E).

Overall, these results indicate a diversified and relevant sample, which enhances the robustness of the empirical analysis.

3. Univariate analysis:

The following table presents the mean score intervals corresponding to each response category of the reverse-coded Likert scale used in this study, in order to facilitate the interpretation of the results.

Table 13: The Interval of Minimum and Maximum Means

Interval	[1-1.75[	[1.75-2.5[	[2.5-3.25[	[3.25-4[
Relative weights	Strongly Agree	Agree	Disagree	Strongly Disagree

Source: Prepared by the authors based on the Likert scale used.

The results obtained from calculating the means and standard deviations of the different questionnaire items reveal a certain variability in respondents' opinions regarding the dimensions of competency evaluation and the effectiveness of training systems within the organization. The following table provides a synthetic presentation of these findings, indicating for each item the mean, the standard deviation, and the observed level of agreement.(Appendix F)

Table 14: Statistical Analysis According to the Studied Dimensions

Dimensions		Mean	Standard Deviation	Relative Weight
Competency Evaluation Process		3.2926	0.4586	Strongly Disagree
01	Competency evaluation is conducted on a regular basis.	3.23	0.622	Disagree
02	The evaluation process follows clearly defined steps.	3.19	0.642	Disagree
03	Employees are informed about the evaluation procedures.	3.44	0.642	Strongly Disagree
04	Competency evaluation is organized according to a precise schedule.	3.25	0.695	Strongly Disagree
05	Sonatrach TRC has a formal competency evaluation process.	3.35	0.695	Strongly Disagree
06	evaluation is conducted systematically	3.30	0.703	Strongly Disagree
Evaluation Criteria		3.3444	0.4549	Strongly Disagree
01	The criteria for competency evaluation are clearly defined.	3.32	0.631	Strongly Disagree
02	he criteria are adapted to job requirements.	3.30	0.659	Strongly Disagree
03	criteria allow for the assessment of actual competencies.	3.30	0.650	Strongly Disagree

04	The evaluation criteria are known to employees.	3.46	0.596	Strongly Disagree
Evaluation Methods and Tools		3.2389	0.5173	Disagree
01	Competency evaluation uses appropriate methods.	3.21	0.673	Disagree
02	The evaluation tools ensure objectivity in the assessment.	3.30	0.659	Strongly Disagree
03	tools are adapted to the work context.	3.20	0.667	Disagree
04	Evaluation methods are applied consistently	3.24	0.685	Disagree
Limitations of Competency Evaluation		3.3938	0.4146	Strongly Disagree
01	Competency evaluation lacks objectivity.	3.38	0.571	Strongly Disagree
02	The competency evaluation tools used have shortcomings.	3.38	0.571	Strongly Disagree
03	evaluation does not always reflect actual competencies.	3.41	0.639	Strongly Disagree
04	The absence of competency evaluation makes it difficult to identify training need.	3.41	0.59	Strongly Disagree
05	Training systems are organized without relying on a real assessment of competency levels.	3.39	0.646	Strongly Disagree
06	Competency evaluation reduces the effectiveness of training programs.	3.40	0.649	Strongly Disagree
Effectiveness of Training Systems		3.1511	0.5157	Disagree
01	Training systems help develop the competencies required for the job.	3.04	0.721	Disagree
02	The acquired competencies are applied in the workplace.	3.10	0.633	Disagree
03	Training contributes to improving performance.	3.08	0.763	Disagree
04	Training responds to actual competency needs.	3.21	0.659	Disagree
05	Training effectively reduces competency gaps.	3.33	0.721	Strongly Disagree

Source : Author's own elaboration based on SPSS results

The analysis of the results shows all the evaluated dimensions the Competency Evaluation Process, Evaluation Criteria, Evaluation Methods and Tools, Limitations of Competency Evaluation, and the Effectiveness of Training Systems.

3.1.the Competency Evaluation Process :

The results related to this dimension show a mean of 3.29 with a standard deviation of 0.46, indicating that respondents generally “strongly disagree” that the competency evaluation process is effectively implemented. The low dispersion of responses suggests a relatively homogeneous perception among respondents regarding this dimension.

3.2.Evaluation Criteria :

With a mean of 3.34 and a standard deviation of 0.45, this dimension also reflects a general level of strong disagreement among respondents. The relatively low standard deviation indicates a fairly consistent perception across participants regarding the evaluation criteria.

3.3.Evaluation Methods and Tools :

The results of this dimension show a mean of 3.24 and a standard deviation of 0.52, indicating that respondents generally “disagree” with the effectiveness of the evaluation methods and tools. The dispersion of responses remains moderate, suggesting some variation in participants’ opinions.

3.4.Limitations of Competency Evaluation :

The results for this dimension show a mean of 3.39 and a standard deviation of 0.41. Considering the reverse coding applied to this dimension, these findings indicate that respondents initially expressed strong agreement regarding the existence of limitations in the competency evaluation process. The low dispersion of responses suggests a relatively consistent perception among participants.

3.5.The Effectiveness of Training Systems :

The mean obtained is 3.15 with a standard deviation of 0.52, indicating a general level of disagreement among respondents regarding the effectiveness of training systems. The moderate standard deviation suggests a relatively consistent perception 5 participants.

4. Normal Distribution :

The distribution of the data was analyzed to assess its conformity with a normal distribution using the Kolmogorov–Smirnov test (for $N > 50$).

- Null Hypothesis (H_0): The data follow a normal distribution.
- Alternative Hypothesis (H_1): The data do not follow a normal distribution.

Table 15: Normal Distribution test

	Sig	Hypothesis
Variables	0.001	H1

Source : Author’s own elaboration based on SPSS results

The results of the normality test indicate that the data do not perfectly follow a normal distribution. However, this result may be explained by the high sensitivity of these tests to sample size, particularly when the sample exceeds 100 observations (Field, 2017), as is the case

in this study ($N = 135$). To further assess data normality, the Skewness and Kurtosis coefficients were examined. The obtained results show that all values fall between -1 and +2, which corresponds to the normality thresholds generally accepted in methodological literature. These findings therefore allow the data to be considered approximately normally distributed and confirm that the assumptions required for the application of parametric statistical analyses are satisfied.

4.1. Multicollinearity Test:

Table 16 : Multicollinearity Test

Independent Variables	Tolerance	VIF
Evaluation Process	0.868	1.152
Evaluation Criteria	0.608	1.644
Evaluation Methods and Tools	0.742	1.347
Evaluation Constraints	0.791	1.264

Source : *Author's own elaboration based on SPSS results*

The results of the multicollinearity test show that the tolerance values range between 0.608 and 0.868, while the Variance Inflation Factor (VIF) values range between 1.152 and 1.644. These values are well within the thresholds recommended in the literature (Tolerance > 0.10 and VIF < 10), indicating the absence of multicollinearity among the independent variables (IV1, IV2, IV3, and IV4). Therefore, the regression model can be considered stable and reliable for analyzing the relationships between the studied variables.

The underlying assumptions of linear regression were rigorously verified in order to ensure the validity of analyzing the impact of the independent variables on the dependent variable. The examination of multicollinearity confirmed the absence of correlations among the explanatory variables, thereby ensuring their independence and the stability of the model. In addition, the normality of the data and residuals was assessed using histograms and P-P plots, which indicated a distribution generally consistent with the assumptions of normality. Furthermore, the Durbin-Watson test result (1.722) confirmed the absence of autocorrelation among the errors, thereby supporting the independence of the residuals. Consequently, since all the required statistical assumptions were satisfied, the linear regression model can be considered robust, reliable, and appropriate for analyzing the impact and relationships among the variables under study

5.Hypotheses testing:

Within the scope of this study, hypothesis testing was conducted to examine the impact of competency evaluation dimensions on the effectiveness of training systems. multiple linear regression analysis was conducted to evaluate the combined effect of all competency evaluation dimensions on the effectiveness of training systems. This analysis helps determine the explanatory contribution of each dimension within the overall model.

The following tables presents the results of the hypothesis testing:

Table 17: Results of Multiple Linear Regression Analysis

Independent Variable	Dependent Variable	Beta	R ²	T	Sig	Hypotheses
Competency Evaluation Process	Effectiveness of Training Systems	0.294	0.239	3.332	0.001	H1a
Evaluation Criteria	Effectiveness of Training Systems	0.165	0.239	1.682	0.095	H1b
Evaluation Methods and Tools	Effectiveness of Training Systems	0.180	0.239	1.995	0.048	H1c
Limitations of Competency Evaluation	Effectiveness of Training Systems	-0.082	0.239	-0.998	0.320	H1d
Competency Evaluation	Effectiveness of Training Systems	0.432	0.186	5.516	0.000	H1

Source : Author's own elaboration based on SPSS results

The objective of this analysis is to examine the impact of competency evaluation dimensions on the effectiveness of training systems using multiple linear regression.

- **Hypothesis H0:** The competency evaluation process has no significant effect on the effectiveness of training systems
- **Hypothesis H1a:** The competency evaluation process has a significant and positive effect on the effectiveness of training systems

The beta coefficient is 0.294, indicating a moderate positive influence .The T-test value is higher than 1.96 (t = 3.332), and the p-value is significant (p = 0.001 < 0.05), confirming that this variable has a significant effect. Therefore, hypothesis H1a is accepted.

- **Hypothesis H0 :** Evaluation criteria have no significant effect on the effectiveness of training systems
- **Hypothesis H1b :** Evaluation criteria have a significant and positive effect on the effectiveness of training systems

The beta coefficient is 0.165, indicating a weak positive influence. The T-test value is below the critical threshold ($t = 1.682$), and the p-value is greater than 0.05 ($p = 0.095$), indicating the absence of a significant effect. Therefore, hypothesis H1b is rejected and the null hypothesis is accepted.

- **Hypothesis H0:** Evaluation methods and tools have no significant effect on the effectiveness of training systems
- **Hypothesis H1c :** Evaluation methods and tools have a significant and positive effect on the effectiveness of training systems

The beta coefficient is 0.180, indicating a weak positive influence. The T-test value is close to the critical threshold ($t = 1.995$), and the p-value is significant ($p = 0.048 < 0.05$), confirming the presence of a significant effect. Therefore, hypothesis H1c is accepted.

- **Hypothesis H0:** Limitations of competency evaluation have no significant effect on the effectiveness of training systems
- **Hypothesis H1d:** Limitations of competency evaluation have a significant effect on the effectiveness of training systems

The beta coefficient is negative ($\beta = -0.082$), indicating a weak negative influence. The T-test value is low ($t = -0.998$), and the p-value is not significant ($p = 0.320 > 0.05$), confirming the absence of a significant effect. Therefore, hypothesis H1d is rejected and the null hypothesis is accepted.

The multiple linear regression equation can be formulated as follows :

$\text{Effectiveness of Training Systems} = 1.204 + 0.330 (\text{Competency Evaluation Process}) + 0.187 (\text{Evaluation Criteria}) + 0.179 (\text{Evaluation Methods and Tools}) - 0.102 (\text{Limitations of Competency Evaluation})$
--

This equation shows that the competency evaluation process and evaluation methods and tools are the dimensions that significantly influence the effectiveness of training systems within the proposed model.

In general, the analysis of the results shows that competency evaluation, as an overall independent variable, has a significant effect on the effectiveness of training systems. The beta coefficient ($\beta = 0.432$) indicates a moderate positive effect. The coefficient of determination ($R^2 = 0.186$) means that competency evaluation explains approximately 18.6% of the variance

observed in training system effectiveness. The T-test ($t = 5.516$; $p = 0.000$) confirms that this effect is statistically significant.

However, when examining the individual variables, it appears that only certain dimensions, namely the competency evaluation process and evaluation methods and tools, contribute significantly to explaining training system effectiveness. The other variables, namely evaluation criteria and limitations, do not have a significant impact when considered separately.

These results partially validate hypothesis H1, suggesting that certain dimensions of competency evaluation play a key role in improving the effectiveness of training systems.

6. Documentary Analysis :

This section analyzes the main official documents related to the training system in order to understand current practices and their linkage with competency evaluation. The analysis covers two key documents: the Annual Training Plan Preparation Process and the Annual Training Report.

6.1 Analysis of the Annual Training Plan Preparation Process :

The document “Process for Preparing the Annual Training Plan” presents a well-structured nine-stage methodology for identifying, consolidating, and approving training needs within COM activity. Nevertheless, documentary analysis highlights notable weaknesses in integrating skills assessment as a core element for improving training effectiveness:

- **Absence of linkage with skills evaluation:** Training needs identification (Phase 3) is based mainly on strategic goals without requiring formal competency assessment or skills gap analysis, which reduces the accuracy and relevance of training interventions.
- **Predominantly administrative focus:** The process prioritizes hierarchical validation and procedural control over pedagogical and evaluative dimensions, contrary to modern HRD approaches that link training effectiveness directly to rigorous competency assessment.
- **Limited evaluation mechanisms:** The document lacks clear KPIs and feedback loops connecting the training plan with previous skills assessments or post-training results, thereby restricting the measurement of training impact and ROI.

In conclusion, the current process adopts a traditional top-down planning approach that underutilizes skills assessment. This limits the overall effectiveness of the training system. Integrating systematic competency evaluation would significantly enhance the relevance and impact of training programs.

6.2 Documentary Analysis of the Annual Training Report

The Annual Training Report of SONATRACH TRC highlights a strong focus on quantitative indicators of training implementation. During the year, the company recorded a total of 10,225 training participations involving 8,662 employees, with an overall cost of 1,258.35 million Algerian Dinars.

While these figures demonstrate significant quantitative efforts in training delivery, the report remains limited to statistical and financial data (number of participations, number of beneficiaries, and total cost). It does not provide any information regarding:

- The extent to which the implemented training systems were based on actual competency assessment results.
- The coverage rate of identified skills gaps.
- The effectiveness of the training actions (acquisition of competencies, transfer of learning to the workplace, or return on investment).

This analysis reveals a predominantly quantitative and budgetary approach in the report, with little emphasis on the qualitative dimension linked to competency development. Such an orientation aligns with the observations previously noted in the document on the Annual Training Plan Preparation Process, particularly the weak integration of competency evaluation within the training system.

Section 02: Discussion

In the context of this research, we investigated the influence of competency evaluation practices on the effectiveness of training systems within the organization. The main objective was to examine the extent to which the different dimensions of competency evaluation, namely the competency evaluation process, evaluation criteria, evaluation methods and tools, and limitations of competency evaluation, contribute to improving the effectiveness of training systems.

This section aims to discuss the obtained results through multiple linear regression analysis. The purpose is to interpret these findings in light of the research hypotheses and to compare them with previous studies, in order to better understand the impact of competency evaluation dimensions on the effectiveness of training systems in the organizational context.

1. Descriptive analysis of respondents' profile:

The analysis of the respondents' profile highlights several relevant characteristics that help to better understand the composition of the studied sample within the context of this research on competency evaluation and the effectiveness of training systems.

1.1. Gender:

The results indicate a slight predominance of females within the sample, reflecting a relatively balanced participation with a minor tendency in favor of this group. This finding is consistent with (Wenjie & Ka Yuk Chan, 2025), who emphasize that individual characteristics may influence how competencies are perceived and developed within organizations.

1.2. Age:

The findings show that the majority of respondents belong to the professionally active age group (35–45 years), characterized by work experience and organizational involvement. These results are consistent with studies on competency development (Akkacha, 2021), which emphasize the important role of active employees in training processes.

1.3. Educational level:

The results reveal a clear dominance of respondents with a university-level education, indicating a relatively high level of qualification. This observation is consistent with previous research (Berkut, 2021), which suggests that educational level plays a key role in understanding and evaluating competencies.

1.4. Profession:

The sample is mainly composed of middle management and operational staff, reflecting a certain level of professional diversity. This finding aligns with studies in human resource management (REZIGA , 2023), which indicate that job position influences the perception of competency evaluation systems.

1.5. Length of service:

The results indicate that most respondents have more than 10 years of professional experience, reflecting a high level of expertise. This finding is in line with previous studies (Chen, Zhang, & Li, 2022), which suggest that professional experience contributes to improving competency evaluation and training effectiveness.

2. The impact of competency evaluation dimensions on the effectiveness of training systems :

This section discusses the results of the regression analyses conducted to assess the impact of competency evaluation dimensions on the effectiveness of training systems.

2.1. The impact of the competency evaluation process on the effectiveness of training systems :

The results indicate that the competency evaluation process has a significant positive effect on the effectiveness of training systems. This finding confirms that the existence of a structured evaluation process helps organizations identify employees' actual competency needs and improve the alignment between training systems and job requirements.

This result is consistent with the study of (Schweizer, 2024), which confirmed that accurate competency assessment is a fundamental condition for designing effective training systems. It also aligns with (Akkacha, 2021), who emphasized that structured competency development and evaluation contribute to improving training outcomes.

However, the field investigation conducted within the organization under study revealed the absence of a formal and structured competency evaluation system, which negatively affected training effectiveness. Training systems are not always based on an accurate identification of employees' actual competency needs, causing some training activities to lack organization and effectiveness and preventing them from achieving the expected results adequately.

2.2. The impact of Evaluation criteria on the effectiveness of training systems :

The results show that evaluation criteria do not have a significant effect on the effectiveness of training systems. This finding can be explained by the fact that evaluation criteria may not be sufficiently clear or not directly aligned with actual job requirements, which limits their ability to improve training outcomes.

This result is consistent with the study of (Berkut, 2021), which emphasized that traditional competency assessment criteria often fail to integrate practical context and individual experience, making their impact on competency development less effective. It is also supported by the study of (REZIGA , 2023), which highlighted difficulties in implementing competency evaluation systems, particularly regarding the lack of precise and well-structured criteria within organizations. This suggests that the lack of clarity and relevance of evaluation criteria reduces their effectiveness in improving training system performance.

2.3.The impact of Evaluation methods and tools on the effectiveness of training systems

The findings reveal that evaluation methods and tools have a significant positive effect on training effectiveness. This result highlights the importance of using appropriate evaluation methods and tools to identify competency gaps and improve decisions related to training activities.

This finding is consistent with (Alzahmi & Alshamsi, 2024), who demonstrated that appropriate evaluation tools positively influence employee performance and organizational effectiveness. It also aligns with (Kashmola, 2025) , who confirmed that training effectiveness depends on the use of suitable methods adapted to organizational and cultural contexts. These results confirm that adopting effective and modern evaluation tools helps organizations improve training quality and ensure better alignment between training systems and employees' competency needs.

2.4. The impact of Limitations of competency evaluation on the effectiveness of training systems :

The results indicate that the limitations of competency evaluation do not have a significant effect on training system effectiveness. This finding is consistent with (REZIGA , 2023), who identified several constraints and difficulties in implementing competency evaluation systems, without necessarily proving a direct impact on training outcomes. It may also suggest that organizations are able to maintain training effectiveness despite the existence of certain limitations in the evaluation system.

3. The impact of competency evaluation on the effectiveness of training systems :

Overall, the results of the study show that competency evaluation has a significant and positive effect on the effectiveness of training systems, confirming its important role in improving training quality within the organization. Effective competency evaluation helps identify employees' actual skill needs and improves the alignment between training systems and organizational objectives.

These findings are consistent with the study of (Bahiroh & Arthawati, 2025), which highlighted that competency-based training and evaluation contribute to improving productivity, motivation, and organizational performance. They are also supported by (Chen, Zhang, & Li, 2022), who found that competency assessment helps reduce skill gaps and improve employees' practical competencies.

However, the detailed analysis shows that this effect is not equal across all dimensions, as only the competency evaluation process and evaluation methods and tools showed a statistically significant effect, while evaluation criteria and evaluation limitations did not show a significant impact.

Furthermore, the field investigation revealed that the organization under study does not rely on a formal and structured competency evaluation system, which clearly affected training effectiveness within the organization. The absence of accurate competency evaluation means that training systems are not always based on employees' actual competency needs, which negatively affects the organization and effectiveness of training activities and prevents some training systems from achieving their expected objectives adequately. Therefore, these findings highlight the importance of implementing a more structured and effective competency evaluation system in order to improve the quality and effectiveness of training systems within the organization.

4. Triangulation of Quantitative Results and Documentary Analysis :

The quantitative results from the questionnaire are complemented by documentary analysis to provide a coherent understanding of the relationship between competency assessment and the effectiveness of training systems.

The findings of the survey indicate a statistically significant positive impact of both the competency evaluation process and evaluation methods and tools on training effectiveness, whereas evaluation criteria and standards were found to have no significant effect. These results are further supported by the documentary analysis.

Indeed, the document related to the annual training plan development process reveals a traditional administrative and hierarchical approach, mainly driven by strategic orientations rather than competency-based assessment. Similarly, the annual report focuses primarily on quantitative indicators (10,225 training participations with a total cost of 1,258.35 million DZD) without any reference to competency evaluation, skills gap analysis, or assessment of training effectiveness.

In conclusion, the triangulation between quantitative findings and documentary evidence highlights a clear gap between the theoretical importance of competency evaluation and its practical implementation within the organization. This gap helps explain the currently limited effectiveness of training systems and emphasizes the need to systematically integrate competency assessment into HR practices.

Chapter 3 Conclusion :

This chapter has highlighted the main results obtained from our empirical survey, in line with the research objectives defined at the outset. Through descriptive analysis, we presented the profile of respondents and identified the main trends related to the dimensions of competency evaluation and training system effectiveness. The regression analysis then examined the effects of the different dimensions of competency evaluation on the effectiveness of training systems, providing concrete answers to our research problem. In addition, the documentary analysis revealed a mainly administrative and hierarchical approach to training management with limited integration of competency evaluation practices. Finally, the interpretation of the results, in light of the theoretical framework and previous studies, enhanced our understanding of the role of competency evaluation in improving training systems.

GENERAL CONCLUSION

The present study aimed to examine the impact of competency evaluation on the effectiveness of training systems within SONATRACH, specifically at the Transport by Pipeline branch (TRC – headquarters). In a context where human resource development has become a strategic priority, this topic highlights the crucial role of aligning training policies with competency-based management practices in order to enhance organizational performance and efficiency.

Analysis of results and practical implications:

The analysis conducted revealed that competency evaluation plays a fundamental and strategic role in determining the effectiveness of training systems. In this regard, the field study highlighted the absence of a formal, structured, and consistently implemented competency evaluation system within the organization, which directly affects the quality, relevance, and alignment of training systems with actual organizational needs. Indeed, training activities are not systematically based on a precise identification of employees' competencies and development gaps, leading to a mismatch between training content and job requirements, and consequently limiting the overall effectiveness and impact of training systems.

Furthermore, the findings demonstrated that certain dimensions of competency evaluation, particularly evaluation processes and methods, can positively contribute to improving training effectiveness. However, this contribution remains limited when such practices are not integrated into a coherent, standardized, and well-structured evaluation framework. This confirms that the effectiveness of training systems depends not only on the existence of evaluation practices, but also on their degree of institutionalization, consistency, and strategic alignment with organizational objectives.

In addition, the documentary analysis revealed that training management within the organization is still largely characterized by an administrative and hierarchical approach, where training activities are mainly implemented in response to operational or procedural requirements rather than as part of a proactive competency development strategy. Such an approach reduces the strategic value of training and limits its capacity to effectively support employee development and long-term organizational performance.

Overall, these findings strongly emphasize the necessity of adopting a comprehensive and competency-based evaluation approach. Establishing a formal and integrated competency evaluation system would enable the organization to identify competency gaps more accurately,

improve the relevance and targeting of training programs, strengthen employee competencies, and ultimately enhance organizational performance in a more sustainable and effective manner.

Limitations of the study and future perspectives:

This study presents some limitations that should be considered:

- **Limited sample size:** constitutes a constraint, as not all employees participated in the survey. This partial response may affect the representativeness of the data and limit the generalization of the results to the entire population of the organization.
- **Restricted field of study:** the research was limited to the Transport by Pipeline branch (TRC – headquarters). This limitation reduces the possibility of extending the findings to other branches or organizations with different structures and practices.
- **Absence of a formal evaluation system:** within the organization represented a major limitation. This lack made it difficult to conduct a deeper and more precise analysis of the relationship between competency evaluation and training effectiveness, as the study relied mainly on employees' perceptions rather than on established evaluation data.

Recommendations :

Based on the results obtained, several practical recommendations can be proposed in order to improve the effectiveness of training systems through better competency evaluation practices.

- **Establish a formal and structured competency evaluation system :**

based on clear and well-defined criteria. Such a system would enable a more accurate identification of employees' competencies and gaps, thereby facilitating better decision-making in training planning.

- Training systems should be closely aligned with the results of competency evaluation, ensuring that they respond directly to the actual needs of employees and the requirements of their positions. This alignment would significantly enhance the relevance and impact of training activities.
- the organization is encouraged to adopt modern evaluation tools and methods, such as competency frameworks, performance indicators, and digital human resource

management systems. These tools would improve the objectivity, accuracy, and efficiency of the evaluation process.

- Promote an organizational culture based on continuous evaluation and development, where competency assessment becomes an integrated and ongoing strategic process rather than a purely administrative or occasional task.

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APPENDICES

Appendix A- Questionnaire

Questionnaire on Competency Evaluation and the Effectiveness of Training Systems

As part of the preparation of a Master's dissertation in Human Resource Management, this questionnaire aims to analyze the impact of competency evaluation on the effectiveness of training systems within Sonatrach TRC headquarters.

This questionnaire is provided in both French and Arabic in order to facilitate understanding. Please choose the language that suits you.

All responses are anonymous and will be used solely for scientific research purposes. Thank you for your collaboration.

Section 1: Respondents' Profile

Q1. Gender

- Male ☐
- Female ☐

Q2. Age

- Under 25 years ☐
- 25–35 years ☐
- 36–45 years ☐
- Over 45 years ☐

Q3. Educational Level

Only one answer is possible.

- Vocational Training ☐
- Bachelor's Degree ☐
- Master's Degree ☐
- Engineering Degree ☐
- Doctoral Degree ☐

Q4. Years of Experience

- Less than 2 years ☐
- 2–5 years ☐
- 6–10 years ☐
- More than 10 years ☐

Q5. Position

- Operational Staff ☐
- Supervisory Staff ☐
- Executive Staff ☐
- Senior Executive ☐
- Top Management Staff ☐

Section 2: Study of the Impact of Competency Evaluation on the Effectiveness of Training Systems

1. the Competency Evaluation Process :

Statement	Strongly Agree	Agree	Disagree	Strongly Disagree
Competency evaluation is conducted on a regular basis.				
The evaluation process follows clearly defined steps.				
Employees are informed about the evaluation procedures.				
Competency evaluation is organized according to a specific schedule.				
Sonatrach TRC has a formal competency evaluation process.				
Competency evaluation is conducted systematically.				

2. Evaluation Criteria :

Statement	Strongly Agree	Agree	Disagree	Strongly Disagree
The criteria for competency assessment are clearly defined.				
The criteria are adapted to the requirements of the job.				
The criteria make it possible to assess actual competencies.				
The criteria are known to employees.				

3. Evaluation Methods and Tools:

Statement	Strongly Agree	Agree	Disagree	Strongly Disagree
Competency assessment uses appropriate methods (observation, interviews, etc.).				
Competency assessment tools enable an objective evaluation.				
Competency assessment tools are adapted to the work context.				
Competency assessment methods are applied consistently.				

4. Limitations of Competency Evaluation :

Statement	Strongly Agree	Agree	Disagree	Strongly Disagree
Competency assessment lacks objectivity.				
The competency assessment tools used have shortcomings.				
Competency assessment does not always reflect actual competencies.				
The absence of competency assessment makes it difficult to identify training needs.				
Training systems are organized without being based on a real assessment of competency levels.				
The absence of competency assessment reduces the effectiveness of training programs.				

5. Effectiveness of training systems.

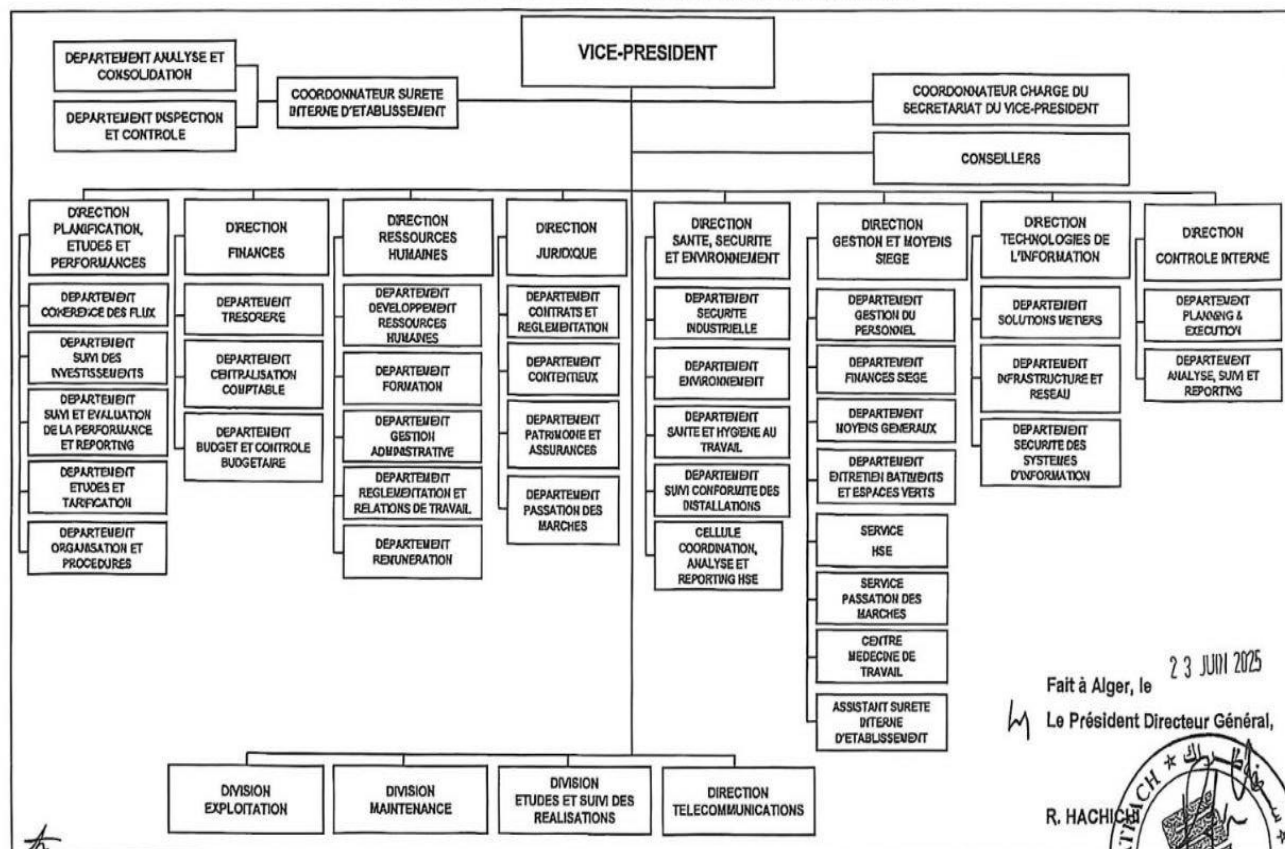
Statement	Strongly Agree	Agree	Disagree	Strongly Disagree
Training systems help develop the skills required for the job.				
The acquired skills are applied in the workplace.				
Training systems contribute to improving performance.				
Training systems meet real competency needs.				
Training systems effectively reduce competency gaps.				

Appendix B - Organization Chart of TRC

N° ²⁹⁰ /DG

Classement : 2.009.1
Référence : A-589 (R10)
Page : 2 de 6

ORGANIGRAMME DE L'ACTIVITE TRANSPORT PAR CANALISATIONS



Fait à Alger, le 23 JUI 2025

Le Président Directeur Général,

R. HACHICHA



Appendix C – Spss Reliability Tests

Statistiques de fiabilité

Alpha de Cronbach	Nombre d'éléments
,866	25

Appendix D – Missing Values

Statistiques univariées

	N	Moyenne	Ecart type	Manquant		Nombre d'extrêmes ^a	
				Effectif	Pourcentage	Faible	Elevée
q001	135	1,45	,500	0	,0	0	0
q002	135	3,07	,807	0	,0	0	0
q003	135	2,53	,896	0	,0	0	2
q004	135	3,26	1,007	0	,0	14	0
q005	135	2,99	,356	0	,0	.	.
VD	135	3,1511	,51570	0	,0	4	0
VI	135	3,3174	,33324	0	,0	5	0

a. Nombre d'observations en dehors de la plage autorisée (Q1 - 1.5*IQR, Q3 + 1.5*IQR).

Appendix E – Respondents' Profile

Gender

		Fréquence	Pourcentage	Pourcentage valide	Pourcentage cumulé
Valide	Female	74	54,8	54,8	54,8
	Male	61	45,2	45,2	100,0
	Total	135	100,0	100,0	

Age

		Fréquence	Pourcentage	Pourcentage valide	Pourcentage cumulé
Valide	Under 25	2	1,5	1,5	1,5
	25-35	33	24,4	24,4	25,9
	36-45	53	39,3	39,3	65,2
	Over 45	47	34,8	34,8	100,0
	Total	135	100,0	100,0	

Length of Service

		Fréquence	Pourcentage	Pourcentage valide	Pourcentage cumulé
Valide	Less than 2	14	10,4	10,4	10,4
	2-5	13	9,6	9,6	20,0
	6-10	32	23,7	23,7	43,7
	More than 10	76	56,3	56,3	100,0
	Total	135	100,0	100,0	

Educational Level

		Fréquence	Pourcentage	Pourcentage valide	Pourcentage cumulé
Valide	Vocational Training	12	8,9	8,9	8,9
	Bachelor's Degree	62	45,9	45,9	54,8
	Master's Degree	40	29,6	29,6	84,4
	Engineering Degree	19	14,1	14,1	98,5
	Doctorate (PhD)	2	1,5	1,5	100,0
	Total	135	100,0	100,0	

Position Held

		Fréquence	Pourcentage	Pourcentage valide	Pourcentage cumulé
Valide	Supervisory Staff	9	6,7	6,7	6,7
	Middle Management	118	87,4	87,4	94,1
	Senior Management	8	5,9	5,9	100,0
	Total	135	100,0	100,0	

Appendix F - Univariate Analysis

Statistiques descriptives

	N	Minimum	Maximum	Moyenne	Ecart type
VI1	135	2,17	4,00	3,2926	,45869
VI2	135	1,50	4,00	3,3444	,45493
VI3	135	1,25	4,00	3,2389	,51730
VI4	135	1,83	4,00	3,3938	,41460
VD	135	1,40	4,00	3,1511	,51570
N valide (liste)	135				

Appendix G – Multiple Regression Tables

Récapitulatif des modèles

Modèle	R	R-deux	R-deux ajusté	Erreur standard de l'estimation
1	,489 ^a	,239	,216	,45663

a. Prédicteurs : (Constante), VI4, VI3, VI1, VI2

ANOVA^a

Modèle		Somme des carrés	ddl	Carré moyen	F	Sig.
1	Régression	8,530	4	2,133	10,227	,000 ^b
	de Student	27,107	130	,209		
	Total	35,637	134			

a. Variable dépendante : VD

b. Prédicteurs : (Constante), VI4, VI3, VI1, VI2

Coefficients^a

Modèle		Coefficients non standardisés		Coefficients standardisés		
		B	Erreur standard	Bêta	t	Sig.
1	(Constante)	1,204	,412		2,922	,004
	VI1	,330	,099	,294	3,332	,001
	VI2	,187	,111	,165	1,682	,095
	VI3	,179	,090	,180	1,995	,048
	VI4	-,102	,102	-,082	-,998	,320

a. Variable dépendante : VD