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Designing a Competency Model for Project Managers in the Iranian Oil and Gas Industry: A Case Study of Iran Gas Engineering and Development Company

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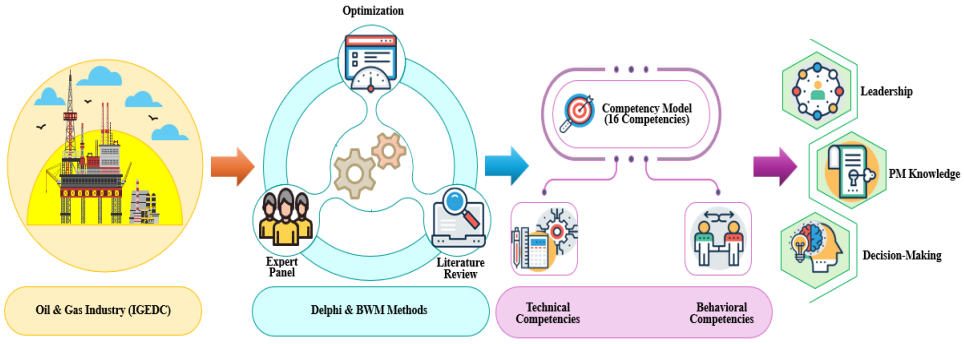
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A B S T R A C T

The success of projects in the oil and gas industry is fundamentally dependent on the effectiveness of project managers, which is essentially determined by their competencies, skills, knowledge, and abilities. This research aims to design a comprehensive competency model for project managers at Iran Gas Engineering and Development Company (IGEDC). Through extensive literature review and analysis of international competency standards, an initial list of competencies was compiled. The Delphi technique was employed in two rounds with fifteen experts to validate the model, followed by the Best-Worst Method (BWM) to rank the identified competencies. The final model comprises sixteen competencies categorized into two main units: technical and behavioral competencies. The findings reveal that leadership, project management knowledge, and judgment and decision-making are the most critical competencies, while national perspective received the lowest weighting. This research contributes to the project management literature by providing a validated, industry-specific competency framework that can serve as a foundation for recruitment, performance evaluation, training, and career development in project-based organizations within the oil and gas sector. The model offers practical implications for organizations seeking to enhance project success through systematic competency-based management approaches.



1. Introduction

In today's rapidly evolving business environment, human resources play an increasingly vital role in creating sustainable competitive advantages for organizations [1]. The Iranian oil and gas industry, as a cornerstone of the national economy, is experiencing significant growth with numerous projects being planned and implemented. Consequently, project management has become critically important, as improper project execution can lead to increased costs, delayed timelines, and reduced profitability of substantial investments in this sector.

Project managers serve as one of the most influential factors in project success, and their competency is essential for achieving desired outcomes [2]. The nature of project management differs considerably from traditional functional management, primarily due to the unique characteristics of projects—defined by specific result requirements, cost and time constraints, and the dynamic environment in which they are implemented. A project manager's activities typically encompass motivation, time management, cost control, scope definition, quality management, and various administrative duties [3].

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Given the pace of change in today's world, new skills and competencies are continually required for managerial roles. Competency models provide organizations with tools to determine future workforce needs and align human resource practices with strategic objectives [4]. These models offer a structured approach to understanding what makes individuals successful in their roles, moving beyond traditional intelligence-based assessments to focus on observable behaviors that lead to superior performance [5].

The competency revolution in the 21st century has gained widespread acceptance for several compelling reasons [5]. First, the most effective way to understand performance is to examine what people actually do to succeed, rather than focusing solely on inherent characteristics like intelligence. Second, evaluating and predicting performance is best accomplished by having individuals demonstrate key competencies rather than through abstract testing of characteristics. Third, competencies can be learned and developed over time, unlike inherent traits that are difficult to change. Fourth, competencies are observable and accessible, enabling better understanding and development of performance levels. Finally, competencies relate to meaningful life outcomes, describing how individuals should perform in the real world rather than emphasizing hidden mental qualities.

Organizations must recognize that competency management and development are critical tools for increasing competitiveness. IGEDC, as an organization with accountable and experienced managers, seeks to upgrade its managers' skills and abilities to successfully execute projects. This requires appropriate tools and methods for project management, among which competency models serve as fundamental frameworks. The significance of this research lies in its potential to address the challenges facing project-based organizations in Iran. One of the primary problems in the successful implementation of national and financial projects, which often leads to substantial losses of financial and human resources, is the absence of competent managers and insufficient utilization of project management techniques. For managers to perform effectively, they must possess the competencies and skills required by their specific domains.

The current research addresses this gap by designing a competency model tailored to the unique context of Iran Gas Engineering and Development Company. This model aims to help the organization identify, attract, and retain the most qualified managers, ultimately contributing to project success and organizational effectiveness.

1.1. Competency: Concept and Definitions

The term "competency" was first introduced by White [6], who defined it as "effective interaction of an individual with the environment," distinguishing between "motivated competency" and "realized capacity." This foundational work established competency as a personality trait associated with superior performance and high motivation.

The concept gained prominence through the work of Harvard psychologist David McClelland, who demonstrated that competencies such as interpersonal relationships, positive intercultural considerations, and managerial skills are distinct from effective and intelligent factors [5]. McClelland described competence as "the characteristic that determines performance"—essentially, "every specific attribute that a person possesses and uses and which leads to successful performance in a role".

Subsequent scholars have expanded and refined this conceptualization. The International Project Management Association (IPMA) defines competency as "the use of knowledge, skills, and abilities to find the desired outcomes" [7]. Similarly, competence has been described as "a set of knowledge, skills, theoretical models, which, if used alone or in combination, lead to successful performance" [8].

More comprehensive definitions incorporate behavioral dimensions. Competencies include "skills, knowledge, abilities and other characteristics that a person needs to perform his or her job" [9]. They represent "the basic characteristics of a person, such as motivation, character, skill, aspects of self-knowledge, social role, knowledge, attitudes, methods of thinking, role play and emotions, that leading to effective or superior performance" [10].

Contemporary perspectives view competency as a measurable human capacity required for proper operation, potentially encompassing knowledge, skills, abilities, personality traits, or combinations of two or more attributes [11]. The Ministry of Labor and the United Nations Industrial Development Organization recognize competence as "a set of skills, related knowledge and attitudes that allow a person to successfully complete tasks or activities related to a particular job" [12].

Synthesizing these definitions, competence can be understood as a unified combination of knowledge, skills, abilities, and motives related to an individual's function in an organizational role—a set of behaviors that contributes to successful performance.

1.2. Competency Levels and Classification

The concept of managerial competencies is often illustrated through the iceberg metaphor. Like an iceberg, much of competence is underwater and invisible, while a smaller portion—such as skill and knowledge—is visible at the surface [8]. The less visible elements, which control and direct apparent behavior, reside in the depths of an individual's being and include motives, traits, self-concept, and attitudes.

Boyatzis [8] proposed a framework identifying three competency categories: individual competence, organizational competence, and occupational competence. Individual competencies encompass the knowledge, skills, and abilities a person brings to a role. Personal competencies represent the main characteristics enabling effective performance, while output competencies refer to verifiable functions that can be displayed at work.

The Freudenberg model offers a more detailed hierarchical classification of competencies into seven categories [4]:

1. Reasoning competence: competencies required for learning, information use, and purposeful rational performance
2. Job Competency: knowledge and skills related to specific job groups, acquired through training and experience
3. Personal effectiveness competence: competencies enabling effective use of personal skills and abilities
4. Communication competence: competencies facilitating information exchange
5. Interpersonal competence: competencies creating and maintaining effective working relationships
6. Group competence: competencies contributing to team creation and effectiveness
7. Organizational competence: competencies supporting overall organizational effectiveness

1.3. Applications of Competencies

Competencies find broad application across human resource management subsystems. Research conducted with 292 human resource pattern group members revealed that 75% of organizations used competencies in selection, promotion, education, and uplift programs, while 65% applied competencies in performance management [13]. Many organizations utilized competencies in succession planning and career path development.

A United Kingdom study in 1994 identified reasons for introducing competencies, including performance improvement (28%), education and growth (21%), changing culture (19%), recruitment (13%), and standards (8%) [14].

1.4. Competency Models: Frameworks and Approaches

Competency models represent regular sets of competencies for specific roles or role groups, providing patterns of successful behaviors. A competency model typically comprises domains, units, and competency components, creating a structure for job descriptions and a scale for performance evaluation [15]. By comparing individual competencies with required job competencies, organizations can effectively measure competence levels and identify development needs.

The value of a competency model lies in its applicability across human resource functions, including strategic workforce planning, selection, training and development, performance management, and compensation [11]. Competency modeling is a continuous process, with models evolving in response to changes in organizational strategies, environmental conditions, job design, and regulatory requirements.

Various approaches to creating competency models have been identified in the literature:

1. Borrowed Approach: The quickest and easiest method, involving adoption of an existing model without modification. While useful when well-adapted to organizational circumstances, this approach carries risks—external models may not capture the unique characteristics of superior performers in a different organization or reflect its specific culture and technical requirements [16].
2. Tailored Approach: Organizations modify existing models to better fit their needs, accepting a particular external model or using existing competency lists from literature reviews, or combining both approaches. Disadvantages include potential disproportion between model and organizational needs, lack of comprehensiveness, and cultural inappropriateness.
3. Design Approach: The most comprehensive method, involving five techniques: process-based, results-based, innovative, tendency-based, and rapid evaluation of work responsibilities [17].

Alternative approaches include:

- Research-based approach: Focuses on studying the behavior of superior-performing managers, though limited by reliance on past rather than future capabilities
- Strategy-based approach: Future-oriented, used when current managers lack needed behaviors and skills
- Value-based approach: Competencies based on organizational cultural values, offering motivational advantages but requiring precise translation of values into behaviors

1.5. Project Management and Project Manager Competencies

A project is "a temporary endeavor undertaken to create a unique product, service, or result" [18]. The project manager, assigned by the performing organization, leads the team responsible for achieving project goals. Project management involves applying knowledge, skills, tools, and techniques to meet project requirements, encompassing identification of requirements, stakeholder management, and balancing competing constraints including scope, quality, timing, budget, resources, and risk.

The Project Management Institute's (PMI) Project Manager Competency Development Framework focuses on three key skill sets through the PMI Talent Triangle [18]:

1. Technical Project Management: Knowledge, skills, and behaviors related to specific domains of project, program, and portfolio management
2. Leadership: Knowledge, skills, and behaviors needed to guide, motivate, and direct teams to help organizations achieve business goals
3. Strategic and Business Management: Knowledge of and expertise in the industry and organization to enhance performance and deliver business outcomes

International standards for project management competencies include:

- PMI's Project Manager Competency Development Framework
- IPMA's International Competence Baseline (ICB)
- Australian Project Management Association Professional Competency Standard
- UK Association for Project Management Competency Framework
- Boston University Project Management Competency Model
- Global Alliance for Project Performance Standards (GAPPS)

1.6. Determinants of Competency Levels and Types

The levels and types of project managers' competencies depend on several factors:

- Project size: Larger projects require higher ability levels and different competency types
- Project complexity: More complex organizational environments demand higher competency levels
- Number and type of organizations involved: Increased stakeholder diversity affects required competencies

1.7. Iran Gas Engineering and Development Company

IGEDC, a subsidiary of the National Iranian Gas Company, operates as an engineering and construction company within the Iranian oil and gas industry. The organization is responsible for technical, economic, basic, and detailed engineering studies, providing resources and managing plans and projects approved by the National Iranian Gas Company in line with its 20-year vision and the country's five-year development plans.

The company's mission focuses on helping the National Iranian Gas Company develop technical and commercial cooperation platforms with public and private sector companies, both domestic and foreign, to develop infrastructure needed for sustainable gas export. Its vision is to become a world-class project-oriented organization through developing organizational capabilities and national and international cooperation networks in the gas industry. This research aims to design a project manager competency model aligned with IGEDC's mission and goals.

2. Materials and Methods

2.1. Research Design

This research employed a mixed-method approach, combining qualitative and quantitative techniques to develop and validate a competency model for project managers. The study proceeded through several phases: literature review to identify initial competencies, Delphi technique for validation, and Best-Worst Method for ranking competencies.

2.2. Statistical Population and Sample

The statistical population comprised all employees of IGEDC. Given the research focus on project managers, the sample included project managers and personnel involved in project implementation. Fifteen experts were selected through non-probability and purposeful sampling based on their expertise and involvement in project management.

2.3. Data Collection Instruments

The research employed both library and field methods for data collection. A questionnaire was designed based on Likert scale (Very Low=1 to Very High=5) to assess experts' opinions on the relevance and importance of competency components. The questionnaire consisted of two sections: general demographic questions and specialized questions examining competency dimensions and components.

2.4. Delphi Technique

The Delphi technique, developed by RAND Corporation in the 1950s, was employed for model validation. This method involves groups of specialists who anonymously respond to questionnaires and receive feedback in the form of statistical representations of "group response", followed by repeated procedures to achieve consensus [19].

1. The Delphi process in this research proceeded through two rounds:
2. Identifying research indicators through comprehensive review of theoretical foundations
3. Gathering opinions of decision-makers using Likert-based linguistic variables
4. Indicator confirmation and screening by comparing index values with threshold values (3)

Panel members were selected through non-probability and purposeful sampling, comprising individuals who served as project managers or project experts involved in IGEDC project execution.

2.5. Validity and Reliability

Content Validity: Content validity ratio (CVR) and content validity index (CVI) were calculated using Lawshe's method [20]. The CVR was determined by asking experts to choose between necessary and unnecessary options for each question:

$$CVR = \frac{n_e - \frac{N}{2}}{\frac{N}{2}} \quad (1)$$

$$CVI = \frac{\sum_1^n cvr}{retained\ numbers} \quad (2)$$

Where:

n_e represents the number of experts finding the question necessary, and N represents the total number of experts. The CVI was calculated as 0.96, confirming the questionnaire's validity.

Reliability: Cronbach's Alpha coefficient was used to assess reliability, yielding values of 0.709 for Round 1 and 0.741 for Round 2, both exceeding acceptable thresholds.

2.6. Best-Worst Method (BWM)

The Best-Worst Method, a recently developed multi-criteria decision-making technique [21], was employed to rank competency components. BWM uses a unique structure requiring less comparison data and reducing inconsistency issues associated with traditional pairwise comparison methods.

BWM Steps:

1. Determine a set of decision criteria
2. Identify the best (most important) and worst (least important) criteria
3. Determine preference of the best criterion over all other criteria using a 1-9 scale
4. Determine preference of all criteria over the worst criterion using a 1-9 scale
5. Find optimal weights by solving a nonlinear min-max model

The linear programming formulation used was:

Min ξ

S.T.

$$\left|W_B - W_J * a_{bj}\right| \leq \xi$$

$$|W_j - W_w * a_{jw}| \leq \xi$$
$$\sum_j w_j = 1$$
$$w_j \geq 0, for\ all\ j \quad (3)$$

Consistency was assessed using consistency ratio, with values closer to 0 indicating higher consistency.

Weights Aggregation: Final weights were determined using the geometric mean method:

$$w_i^* = \frac{\prod_{k=1}^{m} w_i^k}{\sum_{i=1}^{n} \prod_{k=1}^{m} w_i^k} \quad (4)$$

3. Results and Discussion

3.1. Delphi Technique Results

The Delphi technique was conducted in two rounds. In the first round, three criteria (Question 4, 5, and 16) were eliminated as their mean scores were below the threshold of 3. The remaining sixteen criteria proceeded to the second round, where all received mean scores above 3, confirming their validity.

Table 1. Final List of Competencies

Code	Competency	Category
C1	Mastery of English	Technical
C2	Ability to Work with Computers	Technical
C3	Project Management Knowledge	Technical
C4	Familiarity with Oil Industry Rules	Technical
C5	Engineering Insights	Technical
C6	Engineering Judgment	Technical
C7	Judgment and Decision Making	Behavioral
C8	Leadership	Behavioral
C9	Interpersonal Communication	Behavioral
C10	Negotiating and Influencing Others	Behavioral
C11	Analytical and Logical Thinking	Behavioral
C12	Compatibility and Adaptability	Behavioral
C13	Initiative	Behavioral
C14	National Perspective/National Sweat	Behavioral
C15	Behavioral Health	Behavioral
C16	Energetic and Active	Behavioral

3.2. BWM Results

Fifteen experts participated in the BWM process, each identifying best and worst criteria and providing pairwise comparisons. Individual weights were calculated for each expert using Lingo software, followed by aggregation to determine final criteria weights.

Table 2. Final Criteria Weights

Competency	Final Weight	Rank
Leadership (C8)	8.71E-01	1
Project Management Knowledge (C3)	7.40E-02	2
Judgment and Decision Making (C7)	4.73E-02	3
Engineering Judgment (C6)	4.86E-03	4
Engineering Insights (C5)	1.38E-03	5
Interpersonal Communication (C9)	8.97E-04	6
Behavioral Health (C15)	4.61E-04	7
Negotiating and Influencing Others (C10)	7.91E-05	8
Initiative (C13)	5.87E-05	9
Familiarity with Oil Industry Rules (C4)	2.88E-05	10
Analytical and Logical Thinking (C11)	1.32E-05	11
Energetic and Active (C16)	1.07E-07	12
Compatibility and Adaptability (C12)	3.32E-08	13
Ability to Work with Computers (C2)	7.73E-09	14
Mastery of English (C1)	2.97E-10	15
National Perspective/National Sweat (C14)	2.68E-11	16

3.3. Competency Model

The final competency model comprises sixteen competencies organized into two main units: technical competencies (C1-C6) and behavioral competencies (C7-C16). Technical competencies encompass specialized knowledge and skills related to project management and the oil and gas industry, while behavioral competencies address interpersonal and personal effectiveness characteristics.

Image represents a hierarchical model with two main branches:

- Technical Competencies: Mastery of English, Ability to Work with Computers, Project Management Knowledge, Familiarity with Oil Industry Rules, Engineering Insights, Engineering Judgment;
- Behavioral Competencies: Judgment and Decision Making, Leadership, Interpersonal Communication, Negotiating and Influencing Others, Analytical and Logical Thinking, Compatibility and Adaptability, Initiative, National Perspective/National Sweat, Behavioral Health, Energetic and Active;

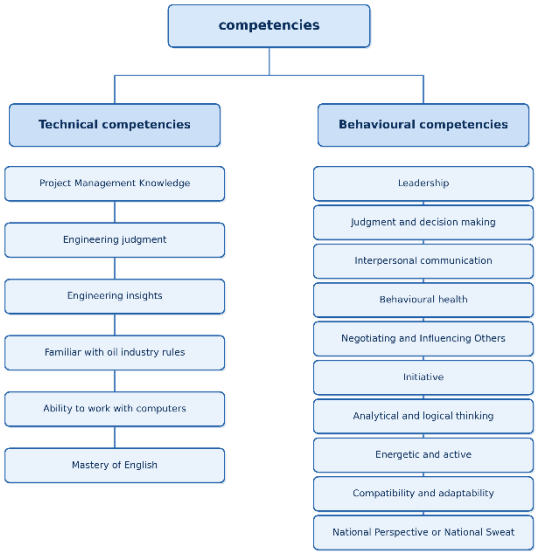


Figure1. Final Competency Model.

3.4. Interpretation of Findings

The research findings reveal that leadership competency received the highest weighting among all competencies, highlighting its paramount importance in project manager effectiveness. This finding aligns with extensive research demonstrating that leadership skills are essential for guiding, motivating, and directing project teams toward successful outcomes [18]. In the context of IGEDC, where projects involve multiple stakeholders, complex technical requirements, and significant financial investments, strong leadership becomes crucial for navigating challenges and maintaining team cohesion.

Project management knowledge emerged as the second most important competency, reflecting the technical expertise required to effectively plan, execute, monitor, and control projects. This finding supports the emphasis placed on project management knowledge in international standards such as PMBOK and IPMA's ICB, confirming that project managers must possess comprehensive understanding of project management processes, tools, and techniques.

Judgment and decision-making ranked third, underscoring the critical role of sound decision-making in project success. Project managers at IGEDC must make numerous decisions under uncertainty, balancing competing constraints and stakeholder expectations. This competency complements leadership and technical knowledge, enabling managers to apply their expertise effectively in dynamic project environments.

Engineering judgment and insights ranked fourth and fifth respectively, indicating the significance of technical engineering knowledge in the oil and gas context. This finding reflects the industry-specific nature of IGEDC's projects, where understanding engineering principles and exercising sound technical judgment are essential for making informed decisions about project design, execution, and quality control.

Interpersonal communication ranked sixth, supporting research demonstrating the importance of communication skills in project management [3]. Project managers must effectively communicate with diverse stakeholders, including team members, senior management, clients, and regulatory bodies, making communication competencies crucial for project success.

3.5. Comparison with Existing Models

The findings of this research align with established competency models while also revealing industry-specific priorities. PMI's talent triangle emphasizes technical project management, leadership, and strategic and business management as key competency areas [18]. While the present research identified similar categories, it placed greater emphasis on leadership and technical knowledge specific to the oil and gas industry.

The Boston University project management competency model encompasses behavioral competencies, business competencies, and professional competencies [18]. Similarly, the present research distinguished between technical and behavioral competencies, though it did not explicitly separate business competencies. The IPMA competence baseline identifies technical, behavioral, and contextual competencies [7], providing a comprehensive framework that partially aligns with the categories identified in this research.

The findings regarding relatively lower weights for computer skills and English proficiency suggest that these competencies, while important, may be considered foundational or facilitative rather than critical differentiators of project manager performance in the IGEDC context. This may reflect the

organizational context, where these skills are considered prerequisites rather than competitive advantages.

3.6. Theoretical Implications

This research contributes to project management literature in several ways. First, it provides empirical evidence supporting the multidimensional nature of project management competencies, demonstrating the importance of both technical and behavioral dimensions. The hierarchical structure of competencies identified through rigorous methodological approaches offers a framework for understanding how different competencies contribute to project manager effectiveness.

Second, the research highlights the influence of industry context on competency prioritization. The emphasis on engineering judgment and familiarity with oil industry rules reflects the technical nature of IGEDC's projects, suggesting that competency models should be tailored to specific industry contexts rather than applied generically.

Third, the application of the Best-Worst Method provides a rigorous approach for competency prioritization, offering methodological implications for future research in this area. The BWM's ability to maintain consistency while reducing comparison requirements makes it particularly suitable for competency modeling research.

3.7 Practical Implications

The competency model developed in this research offers several practical implications for IGEDC and similar organizations:

- Recruitment and Selection: The model provides a framework for identifying and evaluating candidates for project management positions. Organizations can assess candidates against the identified competencies, focusing particularly on the highest-weighted competencies (leadership, project management knowledge, and judgment and decision-making) as key selection criteria.
- Performance Evaluation: The competency model can be integrated into performance management systems, providing clear criteria for evaluating project manager performance and identifying development needs. Annual performance reviews can incorporate competency-based assessments, enabling objective evaluation and constructive feedback.
- Training and Development: The model identifies priority areas for training and development interventions. Organizations can design targeted training programs addressing identified competency gaps, with greater investment in high-priority competencies such as leadership and project management knowledge.

Career Development: The competency model provides a framework for career planning and succession management. Organizations can identify potential project managers based on their competency profiles and develop targeted development plans to prepare individuals for future leadership roles.

4. Conclusions

4.1. Summary of Findings

This research successfully designed a comprehensive competency model for project managers at Iran Gas Engineering and Development Company. Through systematic literature review, Delphi technique validation, and BWM-based ranking, sixteen competencies were identified and prioritized. Leadership, project management knowledge, and judgment and decision-making emerged as the most critical competencies, while national perspective and English proficiency received relatively lower weights.

The competency model provides a validated framework that can guide IGEDC's human resource management practices, supporting the organization's goal of developing competent project managers who can successfully execute complex oil and gas projects. The distinction between technical and behavioral competencies enables a balanced approach to competency development, recognizing that both dimensions are essential for project manager effectiveness.

4.2. Research Contributions

This research makes several contributions to project management theory and practice. Theoretically, it advances understanding of project manager competency structures in the oil and gas industry, providing empirical evidence for the multidimensional nature of competencies and the influence of industry context. Methodologically, it demonstrates the applicability of the Delphi technique and Best-Worst Method for competency modeling, offering a rigorous approach for future research.

Practically, the research provides a validated competency framework that can be applied to recruitment, selection, performance evaluation, training, and career development in project-based organizations. The specific focus on IGEDC offers contextual insights that may be applicable to similar organizations in the oil and gas sector.

4.3. Recommendations

For IGEDC:

1. Integrate the competency model into human resource management systems, including recruitment criteria, performance evaluation frameworks, and training needs analysis.
2. Develop targeted training and development programs addressing the highest-priority competencies, particularly leadership development initiatives, project management knowledge enhancement programs, and decision-making skill-building interventions.
3. Implement competency-based performance evaluation, incorporating the identified competencies into annual performance review processes to provide objective, actionable feedback.
4. Apply the competency model in succession planning, identifying high-potential employees and developing their competencies for future project management roles.
5. Establish competency standards for project management positions, creating clear expectations for project managers at different levels within the organization.

For Future Research:

1. Investigate project risks of managerial origin and their relationship to competency profiles, potentially identifying risk-related competencies that should be incorporated into the model.
2. Conduct comparative studies across multiple oil and gas companies to validate and generalize the findings, enhancing the model's applicability across the industry.
3. Examine the relationship between competency profiles and project outcomes, empirically testing the model's predictive validity.
4. Develop competency-based training interventions and evaluate their effectiveness in improving project manager performance.
5. Explore how competency models might need to evolve with technological changes, examining the impact of digital transformation on project manager competencies in the oil and gas industry.

4.4 Limitations

Several limitations of this research should be acknowledged. First, the study focused on a single organization (IGEDC), which may limit generalizability to other contexts. While the methodological approach and findings are likely relevant to similar organizations, caution should be exercised when applying the model to different industries or organizational contexts.

Second, the research relied on expert judgment through the Delphi technique, which, while providing rigorous validation, introduces potential subjectivity. The BWM process similarly depends on expert assessments of relative importance.

Third, the research focused on identifying and prioritizing competencies without empirically testing the relationship between the competency model and project success outcomes. Future research should examine this relationship to validate the model's practical utility.

Fourth, the dynamic nature of the oil and gas industry, including technological changes and shifting regulatory environments, may require periodic review and update of the competency model to maintain relevance.

Author Contributions

All authors contributed equally to the conception, preparation and writing of this manuscript.

Conflict of Interest

The authors, while observing publication ethics in the referencing, declare the absence of interest of conflict.

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AI Used Statment

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References

[1] M.A. Huselid, *Academy of Management Journal*, 1995, **38(3)**, 635-672.
[2] L. Crawford, *International Journal of Project Management*, 2005, **23(1)**, 7-16.
[3] K. Dziekoński, *Procedia Engineering, 2017*, **182**, 174-181.
[4] F. Rahimnia, V. Haji, *Tomorrow Management*, 2012, 292-298.
[5] D.C. McClellan, *American Psychologist*, 1973, **28(1)**, 297-333.
[6] R.W. White, *Psychological Review*, 1959, **66(5)**, 11-32.
[7] I.P.M. Association, G. Caupin, *IPMA competence baseline: ICB; Version 3.0*. Internat. Project Management Association, 2006.
[8] R.E. Boyatzis, *The competent manager: A model for effective performance*. John Wiley & Sons, 1982.
[9] S.E. Jackson, R.S. Schuler, *Managing human resources through strategic partnerships*. South-Western Pub, 2003.
[10] D.D. Dubois, W.J. Rothwel, *Competency-based human resource management: Discover a new system for unleashing the productive power of exemplary performers*. Nicholas Brealey, 2004.
[11] A.F.Marrelli, J. Tondora, M.A. Hoge, *Administration and Policy in Mental Health and Mental Health Services Research*, 2005, **32(5-6)**, 533-561.
[12] W.-H. Ko, *International Journal of Hospitality Management*, 2012, **31(3)**, 1004-1011.
[13] K.W. Cook, P. Bernthal, *Job/role competency practices survey report*. Development Dimensions International, 1998.
[14] M. Butler, S. Fleming, *The effective use of competencies in the Irish Civil Service*, Vifapol, 2002.
[15] L. Pickett, *Public Personnel Management*, 1998, **27(1)**, 103-115.
[16] D.D. Dubois, *Competency-Based Performance Improvement: A Strategy for Organizational Change*. ERIC, 1993.
[17] W.J. Rothwell, H.C. Kazanas, *Complete AMA guide to management development*. AMACOM, American Management Association, 1993.
[18] Project Management Institute, *A Guide to the Project Management Body of Knowledge (PMBOK Guide)*, Project Management Institute, Inc, 2017.
[19] A. Rasouli-Nia, F. Karimi-Busheri, M. Weinfeld, *Proceedings of the National Academy of Sciences*, 2004, **101(18)**, 6905-6910.
[20] C.H. Lawshe, *Personnel Psychology*, 1975, **28(4)**, 563-575.
[21] J. Rezaei, *Omega*, 2015, **53(31)**, 49-57.