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A Review of Successful Construction Project Managers' Competencies and Leadership Profile

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ABSTRACT

The Project Management Institute (PMI) described project management as “Project Management is the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements”. The nature of projects is always dynamic, uncertainty and different from each other. Project lifecycle is along with risk, changes and even sometimes failing happened. Therefore, to bridge these gaps and to achieve the project goal within budget, time, scope and quality. All projects-oriented organizations such as construction firms, consultancy firms, and information and communication technology (ICT) firms, need for trained, competent, leader and experienced project managers. Among the most important elements for a successful project manager, there are combination of knowledge, skill, leadership, ability and personal attitude which are necessary for successful project completion. So, to percept these combinations in detail it is the main purpose of this paper, to review project manager's competencies and leadership constituents for construction projects throughout lifecycle.

1. Introduction

The Project Management Institute (PMI) described project management as “Project Management is the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements”. One of the overriding issues in the realm of project management is project success and it has been an indispensable topic in the literature. To assess the success, some criteria

are used for measuring the success (success criteria) and some factors are used to assess the projects' success (success factors). It is closely related to concerns about the competency of the project managers. Project managers need to have competency in those areas that will have the greatest impact on successful outcomes, as well as competency in those areas that are critical to successful delivery. [1]. There was no clear, meticulous, and specified definition for the concept of

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competency for ages[2,3]. The best way to determine competency is to consider how knowledge, skill, and attitude combine. [3–12]. Globally, the term 'competency' has many meanings. A straightforward definition that is acceptable to all experts could be provided, so the IPMA individual competency baseline (IPMA ICB) allows professionals to recognize the existing skills, conveniently. "Individual competency is the application of knowledge, skills, and abilities towards achieving the desired result". The main purpose of providing a new definition is to help individual experts gain access to an improving mindset they could use as a framework, rather than providing a replacement for other definitions [13].

Crawford [14] defines project manager competency as the ability to combine knowledge (qualification), skills (ability to perform a task), and core personality characteristics (motivations + traits + self-concepts) to achieve superior results. Crawford noted that successful project management is closely linked to the competency of project managers, and the competency of the project manager drives the success of the project. McClelland [15] made a significant contribution to the field by postulating that managerial capabilities could considerably affect success. Many fellow researchers and experts have been impacted by the results of this noticeable work [2]. Since then, the competency's definition has been rectified. The Competency Leadership School has played a major role in enhancing this new definition. The Competency Leadership School has accomplished its role by uniting the divergent approaches on the earlier models (trait, behavioral, contingency, charismatic, and emotional intelligence) and focusing on its own new approach on the competency concept [16–18]. Project

managers' competencies have been enumerated by multiple scientific surveys [2,3,19–22]. Project management institutions such as the Project Management Competency Development Framework (PMI, 2013) and the International Project Management Association Competency Baseline, have developed various models for competency [23]. Every given role needs a particular range of competencies and a combination of various competencies is needed for a project manager to be qualified to succeed in different projects, as it has been mentioned by different researchers [22,24–26]. Researchers emphasize that "depending on the requirements for success, different sets of competencies encompass different success profiles" [11]. A project manager should have the capability to make a contribution in a leading role as well as managing, mentoring, and facilitating roles, as mentioned by Steven [27]. Furthermore, communication skill is a necessity for a project manager to be as efficacious as possible[22,24–26]. The capability to work under pressure and in a high-stress environment, and yet make reasonable choices is a must for project managers. A project manager should have a profound influence on his/her team that could lead to great teamwork [28]. To fulfill the projects' objectives, a various range of skills are needed for a project manager including directing, coordinating, planning, and controlling complicated processes as well as people [28].. Both management and leadership skills are essential for a project manager to be able to have constructive communications with stakeholders and make the most appropriate choices. Working with a divergent group of people with different backgrounds should be considered as an opportunity and a professional project manager should use this situation in the favor

of the whole team. The leadership style of the project manager influences the success process [26]. Moreover, according to El-Sabaa [29], the impact of human expertise is far more important than technical ones. In various projects, one of the factors that can lead to project management failure is hiring the wrong project manager. Therefore, successful project management requires the careful appointment of a qualified project manager [30]. The essential role of project managers' competencies in the succeeding of projects is asserted in many researches as well as standards, as a guideline for developing and assessing the project staff. Standards that relate to aspects of project management competency fall into two main areas - those that relate to what project managers should know are contained in project management knowledge guides; and those that relate to what project managers should be able to do primarily take the form of performance-based or professional competency standards. There are four widely accepted knowledge standards for project management [1,10,31,32].

- PMBOK Guide- Project Management Institute USA, (PMI 2017)
- ICB: IPMA Competence Baseline – International Project Management Association (IPMA2015)
- APM BoK /CRMP BoK – Association for Project Management (UK) (Morris2000)
- AIPM, The Australian Institute of Project Management (AIPM, 2004)

The aim of this article, then, is to examine the key project manager competencies (behavioral, managerial and emotional) and leadership profiles exhibited by project managers in successful projects based on specific contexts and project types that have already been studied and identified by

researchers and academics, and which serve as a basis for project manager capacity building and successful project delivery when recruiting project managers. Since project managers' competencies directly may affect the success of a construction project, it is worth to be reviewed and highlighted in several up-to-date studies.

2. Project Manager's Competencies

Since the 1970s, in consequence of the fast changes of knowledge age, job descriptions were no longer the base of selection processes and the competency approach emerged [4]. The old-fashioned job descriptions were replaced by the new solution of focusing on the competencies of people [4].

Competency's concept was scattered and ambiguous for ages [2,3]. Nevertheless, a combination of skills, attitudes, and knowledge has been accepted as a definition for competency by many researchers [3,5–7,9–12,26]. There are many definitions of 'competency' around the world. A straightforward definition that is acceptable to all experts could be provided, so the IPMA individual competency baseline (IPMA ICB) allows professionals to recognize the existing skills, conveniently. "Individual competency is the application of knowledge, skills, and abilities towards achieving the desired result [13]".

Knowledge: is the collection of information and experience that an individual possesses. For example, understanding the concept of a Gantt chart could be considered knowledge.

Skills are specific technical abilities that enable a person to perform a task. For example, the ability to create a Gantt chart could be considered a skill.

Ability is the effective application of knowledge and skills in a specific context. For example, the ability to create and successfully manage a project schedule can be considered a capability [13,33,34]. According to ICB-IMPA -2015, project manager competencies include three aspects: intellectual, managerial, and emotional skills. A more detailed analysis revealed that all three aspects of managerial competencies (IQ, MQ, EQ) contribute differently to project performance [35]. Intelligence Quotient (IQ) includes critical analysis, self-vision and strategic perspective. Managerial Quotient (MQ) includes communication, resource management, performance, development and empowerment of the team. Emotional Quotient (EQ) includes self-awareness, intuition, sensitivity, and influence (including motivation and conscientiousness) [35]. ICB-IMPA -2015 [13] proposed a table with three aspects of project manager competencies. Muller and Turner [26] found that one IQ sub-dimension (critical thinking) and three EQ sub-dimensions (influence, motivation, and conscientiousness) of fifteen competencies were highly effective in successful project managers in all types of projects.

Table 1. Project Manager’s Competencies table.

ASPECTS	COMPONENTS
Perspective	Strategy
	Government, structure, processes
	Compliance, standard, regulation
	Power and interest
	Culture and values
People	Self-reflection & self-management
	Personal integrity and reliability
	Personal communication
	Relationship and engagement
	Leadership
	Teamwork
	Conflict and crisis
	Resourcefulness
	Negotiation
	Result orientation
Practice	Design
	Requirements, objectives, benefits
	Scope
	Time
	Organization and information
	Quality
	Finance
	Resources
	Procurement and partnership
	Plan and control
	Risk and opportunities
	Stakeholder
	Change and transformation
	Select and balance

Table 2. Fifteen leadership competencies and three styles of leadership [36].

GROUP	COMPETENCIES	GOAL-ORIENTED	INVOLVING	ENGAGING
Intell ectual (IQ)	Critical analysis & Judgment	High	Medium	Medium
	Vision and imagination	High	High	Medium
	Strategic perspective	High	Medium	Medium
Managerial (MQ)	Engaging communication	Medium	Medium	High
	Managing resources	High	Medium	Low
	Empowering	Low	Medium	High
	Developing	Medium	Medium	High
	Achieving	High	Medium	Medium
Emotional (EQ)	Self- awareness	Medium	High	High
	Emotional resilience	High	High	High
	Motivation	High	High	High
	Sensitivity	Medium	Medium	High
	Influence	Medium	High	High
	Intuitiveness	Medium	Medium	High
	Conscientiousness	High	High	High

Engaging is a style based on empowerment and commitment in a highly transformational context. This leadership style is focused on bringing about radical change through engagement and commitment.

Involving is a style for transactional organizations facing significant, but not necessarily radical, changes to their business model or way of working.

Goal-oriented is a style that focuses on achieving clearly understood outcomes in a relatively stable context.

Geoghegan [25] found that of the following project manager leadership competencies, conscientiousness contributes the most to project success. (Motivation, Influence, Self-Awareness, Conscientiousness, Emotional Resilience, Intuition, and Sensitivity). Barkchian [37] Identified and prioritized the construction project manager's competencies as following:

- Leadership
- Managerial
- Professional
- Comprehension
- Communicational
- Efficiency

However, Nidhra and Dondeti [38] noted that it is conceivable that the leadership style and competency of the project leader have no influence on project success, and that the uniqueness, novelty and transience of projects (as well as the associated risk) means that the leader has less influence on performance. But that influence can only be positive if it is measured directly.

A successful project manager should possess the following skills and competencies Rose [39]: Flexibility and adaptability, preference for significant initiative and leadership,

aggressiveness, self-confidence, persuasiveness, eloquence, ambition, activity, assertiveness, effectiveness as a communicator and integrator, a wide range of personal interests, balance, enthusiasm, imagination, spontaneity, ability, to balance technical solutions with time, cost and human factors, well organized and disciplined, more of a generalist than a specialist, able and willing to devote most of his time to planning and controlling, able to identify problems, willing to make decisions, able to keep a proper balance in the use of time. According to Alvarenga [40], the most important competencies of project managers for project success are in a traditional universe of competencies: communication, commitment, leadership, self-management, interpersonal, technical and managerial. Leadership profiles of more and less successful project managers have been found to differ, with intelligence quotient (IQ) appearing to be more prominent than emotion quotient (EQ) [35]. Leadership style and skills play a crucial role in a project's outcome. Project managers have to be equipped with a couple of leadership techniques to make them adaptable for different circumstances [41].

Leadership and management of a project have been considered as two different concepts by some researchers. Project management is about motivating, leading, and directing people to achieve the goals of the organization. Leadership is about the ability to motivate people to do more or work towards common goals in order to be successful. Preparing and organizing the project activities are the main parts of project management [8,42,43]. Leadership in projects includes three broad categories: (a) leadership style, (b) leadership behaviors, and (c) leadership characteristics [44,45]. Leadership styles could be used to classify

various types of leadership behaviors and project managers' behavioral perspectives [46]. The three types of leadership styles are transformational, transactional, and participative [42]. Transformational leadership is the favorable style of leadership, whereas the transactional one has the most influence on leader effectiveness [47–49]. Leadership is a crucial item for workplaces due to (a) the productivity of projects' staff could be affected by leaders and (b) achieving the project's objectives could be possible by motivating the projects' staff which could be influenced by an efficacious leader, researchers concluded [50]. Hasanzadeh et al. [51] Conducted a study to examine the relationship between global leadership and trait development through experience. Globalization requires effective leaders to lead their followers to cultural diversity so that they can operate successfully internationally [42,52]. Globalization is an ongoing process. Globalization is the integration of economies, societies, and cultures through a global communications and trade network [51–53]. To lead in the twenty-first century, business leaders have adapted to globalization and require new leaders with competencies to adapt to cultural sensitivity and diversity [51]. The new leaders, global leaders, lead employees and companies across time zones, countries, languages, and cultures. The seven categories of global leadership competencies are as follows: (a) cultural awareness and sensitivity, (b) knowledge and skills, (c) global mindset, (d) learning from experience, (e) communication, (f) maintaining and developing relationships, and (g) traits or attitudes [51]. As opposed to that, traits and competencies are recognized as the constitutes of leadership attributes, Clarke [46] asserted. . Clarke discovered that

leadership traits have an insignificant share in the areas of leadership effectiveness. Effective leadership depends on the ability of leaders to change their style, behavior, and characteristics depending on the situation [54]. All of the three various types of leadership are applicable by project managers considering the various situations. There are different leadership techniques to be applied in different situations by project managers [41]. Senthill [42] suggested that project managers adapt leadership styles to each situation. In terms of competency, empowering the project team can have a positive impact on the project outcome. Project managers are only as good as their project teams. Meyer [55] explains three main leadership styles: (a) intellectual, (b) managerial, and (c) emotional. To gain different perspectives, [55] collected data from project managers, project owners, and project team members on project leadership styles. From the project manager's perspective, project leadership competencies should include the following skills: (a) assembling teams into efficient subgroups to best achieve project goals and (b) communicating across different time zones, cultures, and regions. From the project owner's perspective, the project manager's competencies should include the following skills: (a) keeping track of project progress, (b) communicating goals effectively, and (c) setting clear objectives. From the project team's perspective, the project manager's competencies should include the following skills: (a) ensure that communication and information flow freely, (b) measure project progress, and (c) ensure that project teams meet deadlines. And he also discovered communication and planning as common project management skills. Trivellas and Drimoussis [56] examined the relationship

between behavioral and managerial competency profiles of project managers (PMs) and project success in a holistic approach and found that PMs who possess a broader repertoire of competencies characterized by high levels of behavioral, managerial, and emotional competencies have greater project success. Specifically, competencies related to efficiency, appreciation, and openness (behavioral competencies), teamwork, customer service, and system control (management competencies), and social awareness (emotional competencies), as well as leadership style, most clearly demonstrated the difference between project managers who have more successful projects and their peers. The following table explains the components of behavioral, managerial, and emotional competencies of project managers.

Table 3. Behavioral, Managerial and Emotional Competencies of Project Managers [55]

BEHAVIORAL COMPETENCES	MANAGERIAL COMPETENCIES	EMOTIONAL COMPETENCIES
Leadership	Interpersonal relationship	Self-awareness
Engagement & Motivation	Teamwork	Self-management
Self-control	Personal development	Social awareness
Assertiveness	Managing future	Relationship management
Relaxation	Promoting continuous improvement	
Openness	Fostering innovation	-
Creativity	Competitiveness	-
Results orientation	Energizing	-
Efficiency	Customer service	-
Consultation	Acculturation	-
Negotiation	Controlling the system	-
Conflict and crisis	Reliability	-
Value appreciation	Coordination	-
Ethics	-	-

According to Brière et al. [17] the project manager's competencies after research analysis, identified as below:

Table 4. Project manager's detail of competencies in international non-organizational government (NGO)

COMPETENCIES	DETAILS
Adaptability	Logistic Aspects
	Cultural Differences
	Tools Used
Type of abilities	General
	Area of Expert
	Project Management
	International Development
	Intercultural
Management skill	Project
	Financial
	Work Organization
	Information
	People
Communication	Writing
	Listening
	Oral Expression
	Dispute Resolution
Personal Qualities	Working Capacity
	Coping with Stress
	humanity
	Patience
	Thoroughness
	Intuition
	Engagement
Interpersonal skill	Team Work
	Negotiation
	Establish a sense of Trust
Leadership	Engage
	Strategic vision
	Understanding one's Environment
Ethic	Management Practice
	Individual Request
	Personal Behavior
Networking and local knowledge	Local Expert
	Stakeholder
	Network
Capacity Building	Local Organization
	Staff Training
Change Management	Strategies

Recent studies by PMI [57] applied the Project Manager Competency Development (PMCD) framework to the skills needed by project managers using the PMI Talent Triangle. The talent triangle focuses on three key competencies: Technical Project Management, the knowledge, skills and behaviors related to specific areas of project, program and portfolio management. The technical aspects of performing one's role. Leadership, the knowledge, skills and behaviors required to lead, motivate and manage a team to enable an organization to achieve its business objectives. Strategic and business management, the knowledge and experience in the industry and company to improve performance and achieve better business results.

According to researchers, the competencies of project managers in the organization can be divided into three areas [3,6,29,58–73].

1. Organizational and management skills:

- Planning and organizing.
- Strong problem orientation
- Delivering Outcome a) Strong goal orientation b) Ability to see the project as a whole c) Ability to visualize the project's relationship to industry and the community d) Intoning decision-making and action e) Project orientation, program orientation, and portfolio orientation.

2. Technical skills/project management skills

- Project knowledge f) Specific knowledge in the use of tools and techniques g) Understanding of methods, processes and

procedures h) Computer literacy i) Project management framework j) Standard for project management of projects k) Project management success stakeholders l) Project requirement and objectives m) Risk and opportunity n) Quality project organization o) Project structure p) Scope and deliverables q) Time and project phases r) Resources, cost and finance s) Procurement and contract t) Control and report u) Information, documentation v) Communication w) PMP certification x) Expertise

3. Human skills/behavioral competencies

- Communication
- Leadership skills
- Motivation
- Negotiation skills
- Creativity skills
- Ethics
- Management of group processes and team building y) Mobilization z) Coping with situations aa) Delegating authority bb) High self-esteem cc) Enthusiasm dd) Decision making ee) Political awareness ff) Commitment gg) Self-control, assertiveness, relaxation hh) Openness ii) Consultation jj) Conflict and crisis management kk) Reliability ll) Personnel management mm) Personal accountability nn) Attitude and ability to deal with ambiguity and change oo) Ability to escalate pp) Length of previous engagements qq) Intuition and improvisation rr) Emotional intelligence ss) Cross-cultural management tt) Problem-solving uu) Adaptation of tools vv) Engagement of a variety of stakeholders

ww) Empowerment of local communities xx)
Sustainable development

Furthermore, Liikamaa [74] divides competencies into five main groups. Personal competencies are self-awareness

(competencies 1-3), self-regulation (competencies 4-12), cognitive skills (competencies 13-15), motivation (competencies 16-19), and social skills or empathy (competencies 20-23) and social skills (competencies 24-29) [75].

Table 5. List of Competencies according to [74]

No	Competencies	Definition of competencies
1	Emotional awareness	Ability to recognize, realize and specify one's feelings
2	Self-confidence	A strong belief in one's capability, competency, and self-esteem
3	Self-assessment	Knowing one's limits and strengths
4	Trustworthiness	Behaving honesty and ethically
5	Maintaining order	concern for order, quality and accuracy
6	Flexibility	Ability to adapt to change
7	Innovation	Being comfortable and open with new ideas, approaches and data
8	Responsibility	Being conscientious and responsible for one's own personal performance
9	Seeking information	Satisfying one's curiosity and desire for knowledge
10	Production efficiency	Perform work quickly and with a high quality
11	Decision quality	Making a decision based on principle, purposes and values
12	Stress management	The ability to handle adverse, tiring and stressful issues and situations
13	Analytical thinking	Breaking down into sub-problem and their systematical diagnosing by a rational principle
14	Conceptual thinking	Identifying, applying and defining concepts
15	Language proficiency	Ability and courage to use foreign language
16	Achievement driven	Willingness to aim at more effective performance
17	Commitment	Adapting the goal of the group or organization
18	Initiative	Recognizing and acting on opportunities and possessing an ability to create opportunities
19	Optimism	Pursuing goal despite obstacles and setbacks
20	Understanding others	Perceiving, considering, and understanding the feeling and viewpoint of others
21	Developing other people	Perceiving the development need of others and reinforcing their abilities
22	Leveraging diversity	Creating opportunities for cooperation with different kinds of people
23	Organizational savvy	Understanding and utilizing organizational dynamics in order to achieve objectives
24	Communication	Listening openly and conveying clearly
25	Conflict management	Arbitrating and resolving differences
26	Management	Concentrating on things
27	Leadership	Concentrating on people
28	Relationship building	Building, cultivating and developing useful relationships and informal networks
29	Collaboration	Working with others toward goals

Management scholar Henry Mintzberg argues that today's managers must be people-oriented, information-oriented, and action-oriented.

According to Laufer et al [76], when unexpected events affect one task, many

other interdependent tasks can also be quickly affected. Therefore, resolving issues as they arise is critical to maintaining work progress. Because project progress depends on the contributions of people representing different disciplines and belonging to

different parties, collaboration is critical to the early identification of problems and the rapid development and smooth implementation of solutions.

Table 6. Four Roles of Project Manager Proposed by [76]

Role	Timing	Key Activates
Develop collaboration	Initially	Select the right people. Develop mutual Interdependence and trust.
Integrate planning, review, and learning	periodically	Develop stable short-term plans & flexible long-term plans. Conduct learning-based project review.
Prevent major disruptions	Occasionally	Anticipate and cope proactively with a few major problems
Maintain forward momentum	Occasionally	Resolve problems by hands-on engagement. Update and connect through frequent face-to-face communication. Move about (walk the floor) frequently.

Competencies are required for project managers in the design phase by Ahadzie et al [77]. The findings indicate that from the perspective of managers (especially managing directors of housing societies in Ghana), project managers are expected to possess the following competencies to ensure effective design management at the design stage of the project life cycle: Expertise in bulk contract packaging; Expertise in performance characteristics of materials used in the design of projects; Expertise in strategies for managing the design process; Expertise in thermal comfort assessment and related precautions in the design of projects; and finally, Expertise in relevant design codes, laws and regulations governing projects.

Zhang et al [78] it is well known that a person's expertise has a significant impact on their performance. While the more traditional "hard" technical skills of project managers have attracted much attention, the "soft" skills, especially soft skills in the construction context, have received little attention. In this study, a well-established competency model from human resource management theories was used as the basis of the theoretical framework for examining the

social competencies of project managers in construction. Four dimensions of social competencies for construction project managers were identified. Collaboration with others, stakeholder management, leading others, and social awareness. Attention to these attributes will help construction project managers develop their social skills and could contribute to better performance in their workplace, which in turn will improve the performance of the entire organization. The 9 components of the social skills cluster, taken from Boyatzis [79].

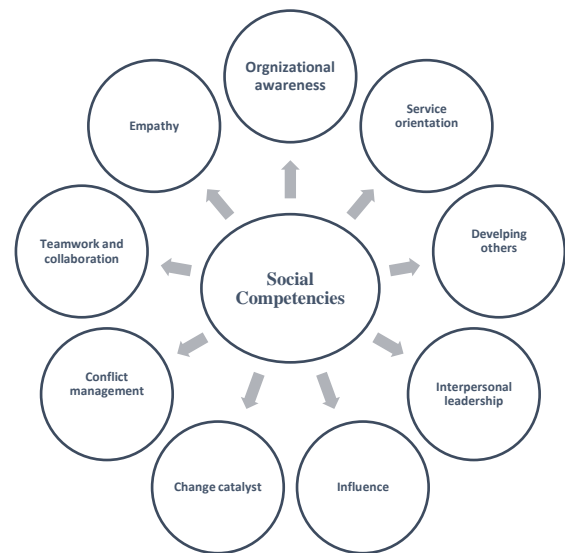


Fig. 1. The 9 components of social competencies cluster.

The results of an exploratory study conducted by Thal et al [80] show that the following personality traits of project managers are very important for project success.

- Extraversion (psychology)
- Agreeableness
- Conscientiousness
- Emotional stability
- Openness

Several researchers [81–86] have found that soft skills such as problem-solving, multitasking, team building, decision making, conflict management, dealing with customers, integrity and personal leadership skills, team development skills, interpersonal skills, communication skills and leadership styles, and personality traits are the most important characteristics of a successful project manager. According to an article by Obradovic et al [87], there is a significant relationship between project managers' emotional intelligence and their professional success. In order to become more successful and be a true leader, project managers need to continuously improve their "emotional intelligence" skills individually and on their own initiative, and it increases with education.

Research by Gillard [68] shows that excellent interpersonal skills or soft skills such as communication, negotiation, conflict management and persuasion are necessary conditions for success. It is becoming increasingly clear that success in the project manager role cannot be achieved with technical skills alone. Zachary and Krone [88] also suggest a balance between the technical and leadership aspects of project

management, noting that the goals of the project manager are to boost team morale and foster good working relationships so that everyone is working eagerly towards a common goal - completion of the project. A combination of human skills as well as organizational skills could lead to efficacious management as stated by Thoms and Kerwin [89]. They assert that leadership is different from management, requires different knowledge and skills, and serves a different purpose. Management deals with the present, leadership with the future. Management deals with resources; leadership deals with people and personalities. Management deals with facts; leadership deals with ideas. Prabhakar [90] asserted that emphasizing a flexible and dynamic [leadership style] is better than a static and rigid style. To enhance the productivity of a project team, every team member should be treated in a unique way by the project manager, as it is suggested by Gillard [68]. One of the indispensable requirements for a project manager is technical skills. Interpersonal skills, also known as soft skills, have a profound impact on the level of success, while some researchers do believe that the mentioned skills could be taught, some dispute. The results of Stevenson et al [3] show that respondents were able to clearly identify six critical core competencies: Leadership skills, ability to communicate at multiple levels, verbal and written skills, attitude, and ability to deal with ambiguity and change, which indicate traits that are important for successful project management.

The study by Zimmerer et al [91] reports the results of a survey of senior project managers. The results clearly and unambiguously identify positive success and negative leadership as causes of project failure. In addition, the characteristics of

leaders are identified as team-building, communicative, high self-esteem, results-oriented, trustworthy, goal-oriented, respectful, flexible to change, team-oriented, supportive of employees, high interpersonal skills and empowerment of subordinates, and the most useful and commonly used project management tools. It can be concluded that organizational effectiveness requires project managers to combine their technical expertise with the ability to develop and display leadership skills. According to [31], a web-based Delphi study shows that experts rated the top 3 most important competencies of project managers as (a) knowing the goals of the project, (b) knowing the scope of the project, and (c) ethical business conduct. The twelve soft/non-technical (interpersonal/human) competencies of project managers were identified in a dissertation [92].

- Communication Skills
- Basic Computer Skills
- Conflict Resolution Skills
- Decision-Making Skills
- Delegation Skills
- Management Support Building Skills
- Motivation Skills
- Negotiation Skills
- Organizational Skills
- Organizational Politics Skills
- Problem-Solving Skills
- Team-Building Skills

3. Discussion

In several studies [24,93–97] on the competencies of project managers in the construction industry found that while the competencies of project managers are very specific to the industry in which they work, the behavioral competencies of project managers are mostly general in nature and

apply to a range of other management positions. The findings of Cheng et al [24] suggest that superior managers exhibit higher levels of 12 core behavioral competencies (behavioral competencies model): (a) performance orientation (improving performance, more entrepreneurial behavior, and more innovation ideas for new services); (b) initiative (proactively acting to avert problems to improve work outcomes); (c) information seeking (proactively exploring problems and solutions outside their immediate environment); (d) Focus on the customer's needs (effort to meet the customer's requirements); (e) Influence and Influence (ability to coordinate, inspire, and lead the team); (f) Directionality (effort to ensure that individual subordinates comply with his/her wishes as intended); (g) teamwork and cooperation (getting the team to perform as intended); team leadership (recognizing when to act authoritatively and when not to act authoritatively in order to get the best out of one's colleagues); analytical thinking (conceptualizing, analyzing, and reasoning in order to make appropriate management decisions); conceptual thinking (being able to see the big picture); self-control (remaining calm and maintaining performance under stressful conditions); and flexibility (remaining adaptable and flexible to solve the problems at hand). The job task competency model [24]:

- Ensuring that the job is properly considered before starting the work.
- Delivering the work to the client's satisfaction and maintaining long-term relationships
- Keeping the budget under control and maximizing the company's profits

- Ensure that the project is completed within the original program requirements
- Ensure that the quality of the end product meets the expectations of all stakeholders.
- Ensure compliance with health, safety and environmental standards
- Ensure that all staff and supervisors know their roles and responsibilities
- Ensure that design and other production information is communicated appropriately and effectively
- communicated to members of the project team
- Promote continuous improvement through team learning and development
- Promote and share knowledge
- Champion company standards and approaches.
- Participate in requests for proposals and submissions
- You will lead meetings and coordinate activities
- Recruit, coordinate and ensure collaboration with supply chain partners

As Pierce [98] mentioned in his work, to understand the competency profile for a particular role, it is crucial to determine that in which work areas (task competencies) managers need to be competent and which characteristics of the individual (behavioral competencies combined with managers' personal characteristics) enable them to be effective and efficient. Ahadzie et al [99] suggested the following competencies needed by project managers for housing construction in Ghana:

- Professional knowledge in site planning techniques for repetitive construction works.
- Commitment to assisting contractors to meet construction schedules
- Knowledge of appropriate technology transfer for repetitive construction works
- Efficient time management of house units
- Ability to find solutions to problems while maintaining good relationships
- Ease of accessibility to project manager for construction activities
- Volunteer to assist contractors or tradespeople in resolving personal issues

Casey Cline [100] identified in a dissertation the most important key competencies required by an effective project manager (PM) in the commercial construction industry in the United States (US). Thirty-two of the competencies listed in this study are referred to as "Hard Skill Competencies" and twelve as "Soft Skill Competencies". The breakdown of the hard skill and soft skill competencies is as follows:

Hard Skill Competencies:

- Building Codes
- Building Systems
- Business Skills
- Business Writing
- Computer Skills
- Construction Materials
- Construction management (management of the construction process)

- Construction Methods
- Safety in construction
- Construction surveying
- Contract administration
- Contract documentation
- Contract law
- Cost accounting
- Use of equipment
- Cost estimation
- Graphics
- Human resources
- Site layout
- Industrial relations
- Management accounting
- Marketing
- Negotiation
- Organizational management (management of the organization)
- Plan reading
- Procurement
- Productivity Analysis
- Public speaking
- Quality Control
- Scheduling
- Structural Analysis
- Temporary Structures

Soft Skills Competencies:

- Analytical thinking

- Acceptance and Advocacy
- Coaching
- Coping
- Delegating
- Facilitation
- Leadership skills
- Professional and ethical judgment
- Social awareness
- Systematic problem solving
- Vision and goal setting
- Partnership with clients

The ten competencies with the highest average scores (soft skills and hard skills) are shown below in order from highest to lowest:

- Leadership Skills
- Construction Management (managing the construction process)
- Professional and ethical judgment
- Contract Documents
- Reading plans
- Negotiation skills
- Systematic problem solving
- Working in partnership with clients
- Analytical thinking
- Scheduling

4. Conclusion

It is obvious that competent project managers are one of the most important success factors in construction projects, no one can ignore this fact. Competencies and leadership styles

that are the result of experience and are built over time have a profound impact on success when combined with project managers, otherwise, we would not be able to succeed at all. So, to summarise, the person who wants to be a successful project manager in construction must have at least the key competencies (technical, emotional, behavioral) and leadership styles to manage projects successfully.

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