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PROJECT MANAGEMENT COMPETENCIES: A LITERATURE-BASED ANALYSIS

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ABSTRACT

A concept that is deemed a critical factor in determining either the success or failure of projects is project management competency. However, examining project management literature reveals that limited reviews of the concept have been conducted based on systematic literature review (SLR) methodology. This study presents a more encompassing SLR on project management competencies. Thus, broadening the scope of the inquiry, specifically, the study was aimed at identifying the various dimensions and positions of project management competencies in literature and also to find from the reviewed literature the prevalent or most occurring project management competencies constituting the core competencies required by project managers, based on a review and synthesis of 50 research studies. The study suggests that project management competencies can be categorized as soft or hard. Prevalent soft competencies identified are people/behavioural, communication, team, and leadership competencies required to manage conflict and project stakeholders, both internal and external. In contrast, hard competencies describe the project management (PM) body of knowledge and knowledge in the subject area that the project manager must know to help deliver projects, as well as computing skills and problem-solving abilities. With the above soft and hard competencies, project managers can deliver projects successfully on time, within budget, and according to specifications. Future research can veer into a quantitative enquiry into the relationship between the competencies above and project success in a specified industry.

KEYWORDS: Project management, Project management competencies, Systematic review, Soft skills, Hard Skills

1.0 INTRODUCTION

It is essential in the business market for organizations to be successful in their projects. According to Crawford (2000), a competent project manager is one of the critical factors determining the success of projects in organizations. This indicates that for project managers to ensure the success of projects carried out by organizations, they need to be equipped with specific skills and competencies reminiscent of the professionals in other disciplines, such as engineering or medicine. However, project management has yet to be widely acknowledged as a discipline despite the existence of project management associations since the late 1960s (Morris, 2003, p. 1). Despite project management tools and techniques gaining recognition and project management organizations growing to be characterized in the likeness of other professional bodies such as in other fields, the acceptance of project management as a discipline and, consequently, its impact on project-based sectors of business and economy are limited at best (Morris, 2003). This may be due to several reasons. There needs to be more research that seeks to investigate project management as a discipline. Also, there needs to be more clarity about using the term 'discipline' and how project management falls under the term. Again, industries and research bodies fail to regard project management as a discipline akin to others, as essential to performance and success in business (Morris, 2003). Morris (2003) summarizes it by claiming that, too often, project management "is seen merely as, at best, project execution or, at worst, planning and scheduling" (p. 1). Nevertheless, according to Kwak (2005), before and during the turn of the 1900s, projects were generally managed by creative minds from disciplines such as architecture and engineering until the 1950s when organizations started to methodically apply project management procedures and practices to large-scale, multifaceted engineering projects – similar to practices in other fields accepted as

disciplines. This shows that the recognition of project management as a field of discipline cannot be dismissed. Morris (1987, as cited in Kwak, 2005) added that project management practices and techniques were recognized as a separate discipline around 1980 by the management of the Atlas missile program, which was modelled on the Polaris project (Mindell, 2011). As a field of discipline, project management must be carried out by practitioners with clearly defined skills and competencies.

The competencies of a project manager are all of the experiences, knowledge, understanding, skills, and abilities that the manager brings to a project (Project Management Forum, 2019, p. 2). Going back, project management was implemented as a technical project without specialized methods or skills. This has changed, with companies increasingly requiring exceptionally skilled project managers with a mix of competencies who can plan, structure, and move projects through the various life cycle phases of initiation, planning, execution, monitoring and control, deployment, closure, and finally, post-project review (Project Management Forum, 2019). Several research studies support this new assertion that project managers need a set of competencies to be effective and contribute to project success or directly impact the success of projects (McClelland, 1973; Alvarenga et al., 2019). However, the numerous studies on competencies have resulted in an "ever-growing list of competencies" (Alvarenga et al., 2019, p. 278) such that project managers are expected to possess an unreasonably wide range of competencies (Napier et al., 2009) with new ones being added regularly. The variety of competencies required by modern project managers has become increasingly extensive to the point that the competencies deemed core to the success of projects are difficult to pinpoint (Alvarenga et al., 2019).

This work is premised on employee competence and performance theories, which seek to say in explicit terms that competent employees can perform efficiently and effectively. These competencies are wide-ranging, and depending on the type of discipline, the employee would need some specific forms of competencies (Elbaz et al., 2018; Kamukama et al., 2017; Mandourah et al., 2017; Otoo, 2019; Otoo & Mishra, 2018; Potnuru & Sahoo, 2016; Scapolan et al., 2017; Zacca & Dayan, 2018; Zaim et al., 2013; Gabriela, 2014; Salman et al., 2020) which are tackled in detail in the literature section. Based on the theories that competent employees can perform efficiently and effectively, employees with the requisite and appropriate project management competencies, as would be unravelled later in this work, could perform the project management job efficiently and effectively in organizations.

1.1 PROBLEM STATEMENT

Project management has been assumed to be a simple technical execution of projects for some time. However, implementing unique practices and techniques has established project management as a discipline for about half a century (McClelland, 1973; Morris, 2003; Alvarenga et al., 2019). Recently, companies have found themselves with people who are working as project managers who have yet to gain prior specialized training or the requisite skill set. The resulting non-performance of these managers may be a deciding factor in the overall success of most projects (McClelland, 1973). Again, existing literature tends to focus on the ever-growing list of competencies required of a project manager to the point that the competencies that are deemed to be core to the success of projects are difficult to pinpoint (McClelland, 1973; Morris, 2003; Alvarenga et al., 2019). It is, therefore, imperative that the core competencies necessary for project managers to ensure the success of projects are revealed through a critical analysis of the literature on project manager competencies. This is imperative, considering that a project manager, for instance, has to be equipped with finance or costing skills to deliver projects successfully by staying within budget, especially in this era of economic crises.

1.2 Research Objectives

The main aim of this study is to contribute to the general body of knowledge and research work in project management competencies that are critical in economic crises. Specifically, the study aims to:

1. Identify the various dimensions and positions of project management competencies in literature.
2. Find from the reviewed literature the prevalent or most occurring project management competencies constituting the core competencies, especially in eras of economic crises

2.0 METHOD

In conducting this systematic review, we adopted Bendermacher, Egbrink, Wolfhagen, and Dolman's (2017) methodological approach to (i) develop a search strategy for using several databases, (ii) define exclusion and inclusion criteria for publications – assess for eligibility, (iii) define review and coding scheme, (iv) analyze and synthesize data and (v) develop write-up. This ensures transparency and rigour regarding the publication selection and analysis process. The database search was delimited to keywords, abstract, and title. Given the literature volume, this strategy was adopted to reduce the number of publications to review while enhancing the precision of the information search (Savolainen, 2016). The goal was to identify relevant publications that explicitly discussed the concept of project management competencies as a central thesis (Syed & Collins-Thompson, 2017).

2.1 Data Collection: Selection of Databases

The researchers used only secondary data, which refers to data already collected for other purposes (Allen, 2017, p. 1). Secondary data is helpful for this study's purpose of analyzing the literature on project management competencies and skill sets as well as project management success factors. To identify publications relevant to the concept being investigated, twelve (12) databases were explored. These include Springer, Association Information System (AIS) library, SAGE Journals, Scopus, IEEE Xplore, Association of Computing Machinery (ACM), Google Scholar, ResearchGate, Academia.edu, Emerald (database), Elsevier (database), and Pro-quest. The above databases were chosen due to the relevance and currency of papers in the project management discipline, especially those on project management competencies. The key search terms or keywords used were project management skills, project management competencies, skills of project managers, and contemporary skills of project managers.

2.2 Criteria for Inclusion and Exclusion of Publications

The number of research publications to be reviewed was reduced by specifying the criteria for inclusion and exclusion. The inclusion criteria were that the publications should be conference papers and articles (conceptual and empirical studies) in peer-reviewed journals written in English. Furthermore, publications such as book chapters, reports, policy documents, newspapers, and magazine reviews were excluded from our sample. As much as the authors tried to restrict the publications to the last 20 years, earlier publications containing vital definitions, concepts, and relevant information relating to the subject matter were included. The pre-selection strategy was adopted to ensure that the systematic literature review process included relevant publications that contributed substantially to the phenomenon under investigation. Also, we examined each article's abstracts, keywords, introduction, and conclusion to reduce selection errors.

2.3 Eligibility assessment

The eligibility assessment involved manually screening each publication to enhance the rigour, accuracy, and reliability of the publication selection process.

2.4 Sample size

A total of 1157 publications were retrieved from the database search, of which 340 were selected based on analysis of titles. A total of 152 publications were deemed irrelevant after analyzing the abstracts of the publications. Also, 65 articles were removed due to duplication, leaving 123

publications. Furthermore, 35 articles were excluded based on the criteria for inclusion and exclusion because they needed to match the research aim. Then, 38 publications were taken out after analyzing the text of the complete publications because the central focus of such publications was not on the concept of project management competencies, leaving a total of 50 (36 empirical studies and 14 conceptual papers) sample size for detailed review and synthesis. It is worth noting that even though the authors worked with 50 articles, not all of them were useful in the analysis.

3.0 RESULTS AND DISCUSSIONS

The literature presents a myriad of competencies required for a project manager to have and exhibit for the successful completion of the project. The project manager is the project's chief executive officer, and as such, the project's success largely depends on the skills he or she brings to bear on the project. The general practice is that the first person to blame is the project manager whenever there is a significant problem with a project, be it delays or any other cause. Therefore, entrepreneurs and job owners need to know the key competencies of project managers to help them recruit the best of them. Competence is a combined set of an individual's knowledge, abilities, and personal characteristics used to perform a specific task or activity (Crawford, 2005; Müller & Turner, 2010).

As cited by Araújo and Pedron (2015), competence is defined as a combined set of an individual's knowledge, abilities, and personal characteristics used to perform a specific task or activity (Caupin et al., 2006; Crawford, 2005; Müller & Turner, 2010). From the quarter of the Project Management Institute, Competence is

> "A cluster of related knowledge, attitudes, skills, and other personal characteristics that affects a major part of one's job correlates with performance on the job, can be measured against well-accepted standards, and can be improved using training and development" (Project Management Institute, 2007, p. 73).

The literature presents several categorizations for competencies. Some of them are discussed below:

i. **Person-Related Competencies**: Woodruffe (1991) defined this competency as a dimension of behaviour. Roberts (1997) defined it as input-based criteria, which means personal behaviour, traits, and characteristics that a person brings to projects.
ii. **Job-Related Competencies:** Roberts (1997) defined this competency as a performance standard expected to be achieved. This type of competency has a direct practical influence on the job, leading to the achievement of the stipulated goal of the project.
iii. **Contextual Competencies**: In research by Crawford (2005), results showed that competencies valued by project management practitioners differed from those valued by senior management. Therefore, contextual competencies should be addressed to have a comprehensive competency standard in which all parties' expectations are fulfilled accordingly.

A core competency is the knowledge, trait, skill, motive, attitude, value, or other personal characteristics important in performing a job. A core competency can be a hard skill, where technical ability is required, or a soft skill, where interpersonal skills are needed. Effective project managers must have hard and soft skills (Alam et al., 2010). Technical ability here does not refer to subject matter experts like the engineering or Information Technology discipline. It is mainly referring to project management as a discipline. While much research agrees, Gillard (2009) determined that soft skills are more important than hard skills. Soft skills encompass a range of competencies but can be considered people skills. This can include interpersonal communication and conflict management, among others. However, hard skills can be seen as the more technical skills. While this traditionally may be thought of solely as technical skills such as programming or deep systems thinking by some**,** hard skills are essential knowledge of project management processes. The project manager must be trained in project management to qualify as a project manager. In other jurisdictions, the supposed project manager must produce professional

certificates like the PMP, Prince2, and so on to be accepted as a qualified or certified project manager.

The Project Management Body of Knowledge (PMBOK) identifies the **hard skill** competencies of effective project managers, supporting each of the ten knowledge areas, including project scope management, time management, cost management, risk management, procurement management, communications management, quality management, resource management, integration management, and stakeholder management.

Soft skills are also essential attributes of an effective project manager. Numerous soft skills have been found to impact a project manager's effectiveness positively. For example, one study identified six "soft skills" core competencies: leadership, communications, verbal and written skills, attitude, and the ability to deal with ambiguity and change (Stevenson & Starkweather, 2010). In another study, optimism positively affected project outcomes by facilitating better collaboration and problem-solving (Smith et al., 2011).

As far back as 1976, Archibald came out with a list of competencies which, when categorized, will fall into the hard and soft competencies needed by a project manager. Prabhakar (2009), in citing Archibald (1976), said that to be a successful project manager, one should have the following skills and competencies:

i. flexibility and adaptability
ii. preference for significant initiative and leadership
iii. aggressiveness
iv. confidence
v. persuasiveness
vi. verbal fluency
vii. ambition
viii. activity
ix. forcefulness
x. effectiveness as a communicator and integrator
xi. the broad scope of personal interests
xii. poise
xiii. enthusiasm
xiv. imagination
xv. spontaneity
xvi. able to balance technical solutions with time, cost, and human factors
xvii. well-organized and disciplined
xviii. a generalist rather than a specialist
xix. able and willing to devote most of his or her time to planning and controlling
xx. able to identify problems
xxi. willing to make decisions
xxii. able to maintain a proper balance in the use of time

The International Project Management Association (IPMA) Competence Baseline divides project manager competencies into three groups: *technical, behavioural, and contextual* (Caupin et al., 2006).

The technical competencies refer to competencies related to project management itself, for example, project planning and time management. Behavioural competencies have to do with the personal abilities and skills of the project manager, such as leadership, creativity, and commitment, and the contextual competencies range involves the competencies related strictly to the context of a specific project, such as development and programming skills, business knowledge, knowledge of legal issues, and others (Caupin et al., 2006).

We compiled an extensive list of IT project manager competencies relevant to IT project success based on various articles, especially the studies of Keil, Lee, and Deng (2013) and Skulmoski and Hartman (2009). These competencies were grouped into ten categories according to their characteristics and purposes. They are discussed below:

i. Team Management: Includes competencies required to manage and lead team members effectively. Not only should IT project managers lead their teams, but they also need to motivate and empower project team members.
ii. Business domain knowledge: This category encompasses the competencies to work effectively with business partners. A successful IT project manager understands the project's overall context and oversees its impact on the organization.
iii. Communication: Communication involves all the skills necessary to communicate effectively with the team, stakeholders, and all those affected directly or indirectly by the project.
iv. People skills: These skills are used to build and maintain good relationships with the individuals involved in the project. Building good relationships is crucial to avoid political and relational obstacles.
v. Technical: Generally, these skills are related to IT developers. They include knowledge of IT development methodologies, processes, and techniques.
vi. Project management: This category includes competencies necessary to ensure the project is well managed, such as planning and motoring.
vii. Personal characteristics: Personal characteristics help project managers achieve positive results. This category includes innate and nurtured personal features.
viii. Organizational: Organizational competencies include abilities that enable the IT project manager to organize and coordinate the project activities and resources.
ix. Problem-solving: Successful IT project managers can identify, analyze, and solve problems that occur during the project.
x. Professionalism: Professionalism refers to the project manager's values and characteristics that express his/her commitment and integrity.

Katz (1974) is one of the pioneers in investigating practical managerial competency skills. He examined the competent skills which executives exhibit to perform their jobs effectively. He suggested three basic developable skills: (1) technical, (2) human, and (3) conceptual. He defines *technical skill* as the "specialized knowledge, analytical ability within that speciality, and facility in the use of the tools and techniques of the specific discipline" *human skill* as "the ability to work effectively as a group member and to build cooperative effort within the team", and *conceptual skill* as the "ability to see the enterprise as a whole including recognizing how the various functions depend on one another and how changes in one part can affect all the others" (Katz, 1974: pp. 91, 93).

Another study was conducted by El-Sabaa (2001), who explored the skills of the ideal project manager in Egypt. El-Sabaa utilized Katz's (1974) three-skill approach and developed a list of 18 characteristics of effective project managers, which he clustered into three-skill categories, namely:
1. Human Skill: This refers to the skill needed in mobilizing, communicating, coping with situations, delegating authority, political sensitivity, high self-esteem, and enthusiasm.
2. Conceptual and Organizational Skill: This refers to skills needed when planning and organizing, strong goal orientation, ability to see the project as a whole, ability to visualize the project's relationship to the industry and the community, and strong problem orientation.
3. Technical Skill: This has to do with special knowledge in using tools and techniques, project knowledge, understanding methods, processes, procedures, technology required, and skills in using the computer.
Lei and Skitmore (2004) surveyed South East Queensland, Australia, and identified essential skills project managers should possess for the future. The skills identified are:

i. technical skill

ii. people skills
iii. legal understanding
iv. client-related skill
v. stakeholder's management skill
vi. cost management skill
vii. computing skill
viii. risk management skill
ix. time management skill
x. coaching skill
xi. networking skills, and
xii. business knowledge.

Kerzner (2009), in his research, also listed ten required competent skills project managers must possess:

i. team building
ii. leadership
iii. conflict resolution
iv. technical expertise
v. planning
vi. organizing
vii. entrepreneurship
viii. administration
ix. management support and
x. resource allocation.

Cech and Chadt (2015) in their research revealed three competencies:

i. **Technical competencies:** This umbrella term serves as an instrument to describe the basic features of the project management competencies. That is, Project management success; Interested parties; Project requirements and objectives; Risk and opportunity; Quality; Project organization; Teamwork; Problem resolution; Project structures; Scope and deliverables; Time and project phases; Resources; Cost and finance; Procurement and contract; Changes; Control and reports; Information and documentation; Communication; Startup; Close-out
ii. **Behavioural competencies**: This is also a feature of competence that helps as an instrument to describe the basic features concerning personal project management-Leadership, Engagement and motivation, Self-control, Assertiveness, Relaxation, Openness, Creativity, Results orientation, Efficiency, Consultation, Negotiation, Conflict and crisis, Reliability, Values appreciation, Ethics.
iii. **Contextual competencies**: Helps as an instrument to describe the features of the project management competencies relating to the project context: Project orientation; Programme orientation; Portfolio orientation; Project, program, and portfolio implementation; Permanent organization; Business; Systems, products, and technology; Personnel management; Health, security, safety, and environment; Finance; Legal.

The Project manager competency development (PMCD) framework utilizes three dimensions of project manager competencies: knowledge, performance, and personal.

i. **Knowledge Competence:** As one of the three central competencies required to be a project manager, knowledge competence is essential to the extent that it reflects the project manager's knowledge or body of information (the processes, tools, and techniques for project activities) required to perform the tasks required for the project (Project Management Institute, 2007).
ii. **Performance Competence**: Regarding knowledge competence, project manager performance competence can be demonstrated by assessing project-related actions and outcomes. In other words, project managers must apply their knowledge to meet project

outcomes. Within project-based sectors, a growing imperative exists to link project managers' performance with the organization's performance (Gillard & Price, 2005).

iii. **Personal Competence**: Personal competence reflects how the project manager behaves when performing activities. The project manager's competence includes elements of the manager's attitude and personality characteristics. These skills tend to be often described as "soft skills" or "other" attributes from an HRM perspective. However, research suggests that personal aspects are essential in the project manager role (Bierhoff & Müller, 2005; Clarke, 2010a; Gehring, 2007; Malach-Pines et al., 2009; Thal & Bedingfield, 2010)

Leadership is one area of personal competency that has received the most attention (Muller et al., 2012). There is a statistically significant relationship between a project manager's leadership competencies and project success; a project's success depends on the project manager's overall competence.

Silvius and Schipper (2014), in their research on project management competency gaps, came out with the following competencies:

i. **Systems Thinking Competencies:** competence of analyzing and understanding root causes of complex problems and the role technology plays in the constellation
ii. **Anticipatory Competences:** the ability to develop visions and scenarios of possible futures based on an extrapolation of the current situation and expected developments
iii. **Normative Competencies:** The normative competencies of understanding concepts of justice, equity, social-ecological integrity, and ethics are most explicitly visible in the Individual Competence Baseline 3 (ICB 3) competencies
iv. **Strategic Competencies:** Strategic competencies refer to designing and implementing interventions. This ability relates to the core function of projects in organizations.
v. **Interpersonal Competencies:** The interpersonal competencies of sustainability, for example, strong communication skills, negotiation skills, collaboration skills, Teamwork, and diversity facilitation, can, without exception, be recognized in the behavioural competencies of the ICB.

Sutling, Mansor, Widyarto, Lecthmunan, and Arshad (2015), in their work "Understanding of Project Manager Competency in Agile Software Development Project (ASDP)", came out with four main competencies needed to be a project manager to ensure success in the agile space. These are as follows:

A. Skill

1. Communication skill: The project manager is expected to have listening and understanding skills to address individual differences and reduce conflict, strengthening cooperation and build good relationships among team members (Adler, 2012; Deemer & Benefield, 2007; Jo, 2010)

2. Team building skills: The project manager should build a strong bond with other team members, and he or she needs to know how these interactions will contribute to their software development tasks.

3. Problem-solving skills: This refers to the ability of the agile project manager to visualize and solve complex problems by making sensible decisions based on the available information.

B. Knowledge

1. Strategic agility: Strategic agility is essential to pay attention to the strategic direction that leads to the big goal and make decisions accordingly.

2. Planning: The project manager must determine what the project will accomplish, when it will be completed, and how it will be implemented or monitored. The project manager must create the plans and define the goals, objectives, activities, and resources needed.

3. Coaching: Coaching is about Teamwork, motivation, communication skills, and strategies. The project manager's primary role is to train staff and help the team into a cohesive unit, facilitate interaction, optimize skills and build motivation towards a common goal. Hence, the project manager should act in developing and implementing the tactics and strategies in much the same way as sports coaches (Fraser et al., 2003).

C. Personal Attribute

1. Common Sense: As a project manager in ASDP, a project manager must use his common sense in most of the project situation for project success (Lajos, 2013)

2. Good Listener: The project manager in ASDP needs to listen to what the customers need and understand the need to provide feedback on the technical aspects of how this problem might be solved or cannot be solved. Therefore, the relationship between the customer and project manager can be handled in the Planning Game (Doug, 2004)

3. Good Communicator: Project managers in ASDP who have good communication can clearly outline what each team member should be doing.

4. Motivator: The project manager in ASDP must have a high level of self-motivation. Project managers must ensure that their teams produce quality work and that the team members make decisions and promptly complete tasks Reich (2013) and Amiryar (2012).

5. Courageous: The project manager must be courageous to develop confidence in the leadership. A leader with significant challenges and risks in ASDP requires more splendid courage and confidence. Therefore, project managers can build more confidence (Anais, 2012).

D. Behavior

1. Leadership: The different leadership styles are more likely to lead to a successful outcome on different types of projects. Furthermore, the leadership style adopted includes patterns of behaviour such as communication, conflict resolution, criticism, Teamwork, decision-making, and delegation (Trivellas & Drimoussis, 2013).

2. Creative and Innovative: Creativity and innovation will enhance the creativity and innovation of project manager behaviour in agile software development. The project manager must communicate creatively using colours, charts, and pictures to communicate concepts visually (Warner, 2012).

3. Openness: The behaviour of Openness, a project manager involving ideas, collaboration, and communication (Goran, 2013). Communication behaviour is essential to project managers in agile software development projects (Thomas, 2012).

4. Communication: Communication behaviour is an essential tool to a project manager, especially in an agile software development project

5. Result Orientation: A project manager is required to ensure project results satisfy one's stakeholder relevance and to help focus current teams and attention on critical objectives to obtain orientation optimum outcome (Gerrit, 2006).

6. Strategic: Strategic is especially important for knowledge throughout project manager behaviour in ASDP. The strategy is inspiring and guiding team members (Steven, 2013). Strategy is usually essential to cover attention to the strategic direction; this leads towards big goals and making decisions accordingly.

7. Ethics: Ethical behaviour leads to better projects, such as honesty, respect, and fairness (John, 2011; Ben, 2012; Scott, 2013).

Hanif and Tariq (2014) identified Teamwork, communication, leadership, decision-making, and organizational skills as some examples of competencies highly desirable in managers. Some core competencies were problem-solving expertise, context knowledge, leadership, and communication expertise (Brill et al., 2006). Another study identifies communication, decision-making, and the ability to meet objectives as core competencies (Lei & Skitmore, 2004). Technical, managerial, leadership, time management, decision-making, and Teamwork were identified as primary competencies in project managers in Hong Kong (Kwok, 2004).

Mansor, Arshad, Yahya, and Razali (2016) also maintained that a project manager's competency provides resource movement with a realistic transition plan that minimizes business impact. Moreover, the project managers need to keep the people continuously motivated and engaged with team members of the project by using a variety of processes, meetings, and documents. In answering the study's objectives, objective one has been fairly dealt with by the extant literature reviewed on the various dimensions and positions by researchers on project management competencies. In answering objective 2, it is clear from the literature reviewed that almost all the researchers conclude with either hard or soft competencies regardless of the angle taken. The soft competencies most commonly identified are people/human/interpersonal/behavioural, communication, team, and leadership. For the hard competencies, the literature reviewed presented vital areas as the project management body of knowledge (key project management knowledge areas like cost management, schedule management, quality management, risk management, scope management), business domain knowledge, computing skills, and problem-solving competencies. Table 1 below shows the summary of a few relevant publications that were used for the analysis.

INSERT TABLE 1 HERE!

4.0 CONCLUSION

The literature review on project management competencies has revealed that regardless of the researcher's position, dimension, and method, all competencies are hard or soft. Hard competencies relate to the knowledge of the project management discipline and what the project manager knows to help successfully deliver projects. This deals with knowledge of the processes involved in project management. It also concerns the project manager's knowledge of the business or functional area he manages. Knowledge of a related business or functional area may be optional. However, it benefits the project manager and the management activity for completing the project in that space. Another area is computing skills and problem-solving abilities.

Four main competencies for the soft competency category were identified: people/human/interpersonal/behavioural competency, communication competency, team competency, and leadership competency. These competencies are needed primarily to manage conflicts and people in general on the project, both internal and external stakeholders. These competencies are typically looked down upon, but they are the very ones that usually become the pain area in the project space. Projects are planned and executed by human beings, so the effective management of all the people in the project space will go a long way to help in the successful completion of the project.

HARD COMPETENCY defines the WHAT? What does the project manager know about the PM discipline he brings on board? SOFT COMPETENCY defines the HOW? How will the project manager manage direct and indirect stakeholders, manage and lead the project team, and manage issues, including conflicts, communication, and interpersonal problems? In other words, WHAT a project manager knows about PM discipline alone cannot guarantee him success; it has to be complemented by HOW he manages, leads, and works with people in a team, and so on, to ensure success. The converse is also true. Future research can veer into a quantitative enquiry into the relationship between the competencies identified in this research and project success in a specified industry.

Figure 1 below shows the summary of the conclusion.

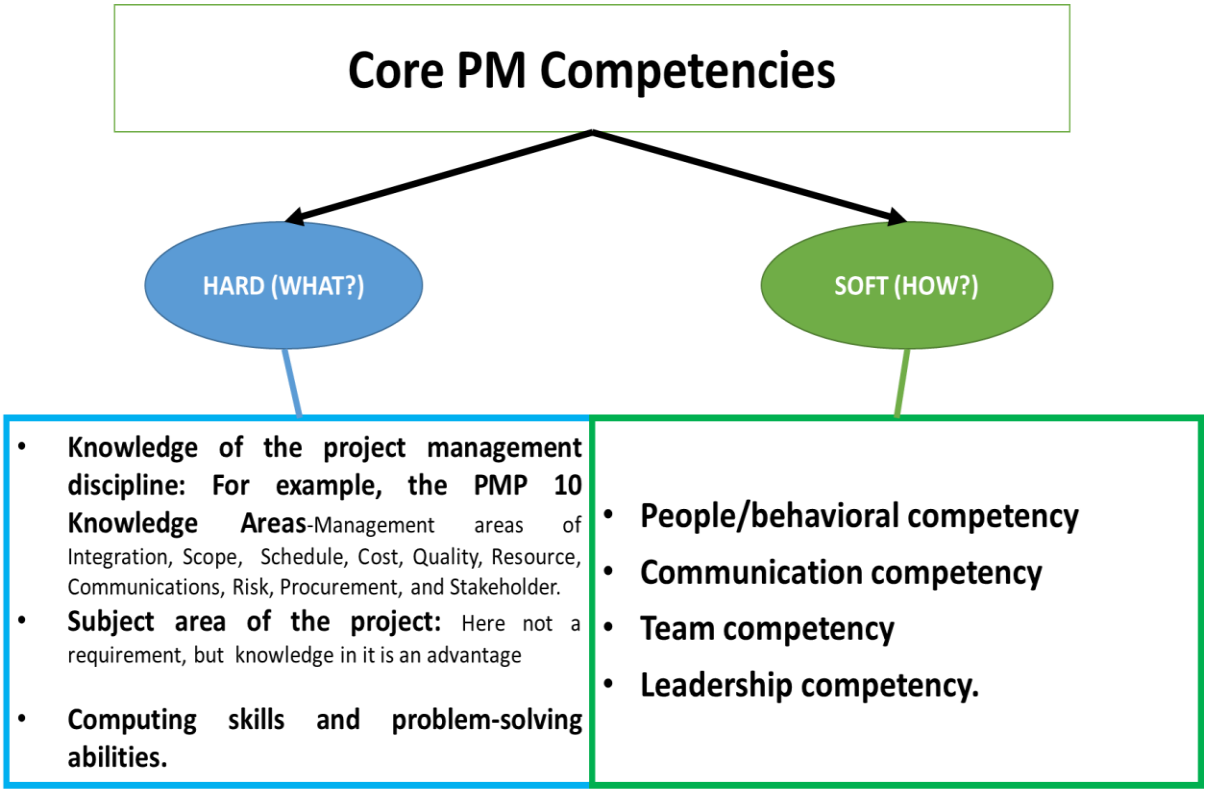

Figure 1: Summary of the conclusion.

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Table 1: Summary Table of relevant publications used for the analysis

Author	Findings/Output of work/area of work	A summary explanation of findings	Categorization: Hard or soft
Crawford, 2005; Müller & Turner, 2010; Project Management Forum, 2019, p. 2	Definition of PM Competence	N/A	N/A
Woodruffe, 1991	Person-Related Competencies	Interpersonal/Behavioural/Person-related Competencies	Soft
Roberts, 1997	Job-Related Competencies	Knowledge in PM Discipline	Hard and Soft
Crawford, 2005	Contextual Competencies	Skills in handling projects in changing environments and conditions: Versatility and Agility	Soft
Alam et al., 2010	Hard and Soft Skills	Hard and Soft	Hard and Soft
PMI-The Project Management Body of Knowledge (PMBOK), 6th edition	Hard Skills for Effective Managers: 10 knowledge areas: project scope management, time (schedule) management, cost management, resource management, risk management, procurement management, communications management, quality management, stakeholder management, and integration management.	Knowledge in PM Discipline	Hard
Stevenson & Starkweather (2010)	Soft Skills for Effective Managers: Leadership, Communications, Verbal and Written Skills, Attitude, Ability to deal with ambiguity and change.	Leadership, Interpersonal/people/Behavioural, and Communication Competencies	Soft Skills
Prabhakar (2008) in citing Archibald (1976)	PM Competencies: • Flexibility and adaptability • Preference for significant initiative and leadership • Aggressiveness • Confidence • Persuasiveness • Verbal Fluency • Ambition	Leadership, Team, Interpersonal/people/Behavioural, and Communication Competencies	Soft Skills

Author	Findings/Output of work/area of work	A summary explanation of findings	Categorization: Hard or soft
	• Activity • Forcefulness • Effectiveness as a communicator and Integrator • The broad scope of personal interests • Poise • Enthusiasm • Imagination • Spontaneity • Ability to balance technical solutions with time, cost, human factors		
Caupin et al. (2006)	Divided Project manager competencies into three broad groups: Technical Competencies, Behavioural Competencies, Contextual Competencies	Technical Competencies, Behavioural Competencies, Contextual Competencies	Hard and Soft
Keil et al. (2013)	10 Categories of Competencies: • Team Management • Business Domain Knowledge • Communication • People Skills • Technical • Project Management • Personal Characteristics • Organizational • Problem Solving • Professionalism	Leadership, Team, Interpersonal/people/Behavioural, Communication, Problem Solving, and Organizational Competencies. Also Knowledge in the PM discipline	Hard and Soft
Katz (1974)	Suggested three basic development Skills: 1. Technical Skill: Specialized Knowledge, the analytical ability within the specialty, and facility in the use of the tools and techniques of the specific discipline. 2. Conceptual Skill: Ability to see the enterprise as a whole including recognizing how various	Technical Competencies, Behavioural/People Competencies, Conceptual Competencies	Hard and Soft

Author	Findings/Output of work/area of work	A summary explanation of findings	Categorization: Hard or soft
	functions depend on one another and how changes in one part can affect all others. 3. Human Skills: Ability to Work effectively as a group member and to build cooperative effort within the team		
El-Sabaa (2001)	Utilized Katz's (1974) three-skill approach and developed a list of 18 characteristics of effective project managers which he clustered into three-skill categories as Human Skills, Conceptual, Organizational Skills, and Technical Skills.	Human/People Skills, Conceptual, Organizational Skills, and Technical Skills.	Hard and Soft
Lei & Skitmore (2004)	Proposed the following essential Skills for future Project Managers: • Technical Skills • People Skills • Legal Understanding • Client related skill • Stakeholder's management skills • Cost Management Skills • Computing Skills • Risk Management Skills • Coaching Skills • Time Management Skill • Networking Skill • Business Knowledge	Human/People Skills, Conceptual, Organizational Skills, Legal, Coaching, and Technical Skills. Also Knowledge in the PM discipline	Hard and Soft
Kerzner, 2009	Identified ten Required Competent Skills of Project Managers: • Team Building • Leadership • Conflict Resolution • Technical Expertise • Planning	Leadership, Team, Interpersonal/people, Behavioural, Technical, Entrepreneurship, and Communication Competencies	Hard and Soft

Author	Findings/Output of work/area of work	A summary explanation of findings	Categorization: Hard or soft
	• Organizing • Entrepreneurship • Administration • Management Support • Resource allocation		
Cech & Chadt (2015)	Revealed three Competencies: 1. Technical: This is an umbrella term that serves as an instrument to describe the basic features of the project management competencies. 2. Behavioral: A feature of competence that helps as an instrument to describe the basic features concerning personal project Management. 3. Contextual: Helps as an instrument to describe the features of the project management competencies relating to the project context	Technical Competencies, Behavioural/People Competencies, Contextual Competencies	Hard and Soft
Cartwright, C. & Yinger, M. (2007)	The Project manager competency development (PMCD) framework utilizes three dimensions of project manager competencies: 1. Knowledge (Project Management Institute, 2007). 2. Performance (Gillard & Price, 2005). 3. Personal (Bierhoff & Müller, 2005)	Knowledge in PM, Performance, and Personal	Hard and Soft
Silvius & Schipper (2014)	In their research for project management competency gaps, came out with the following competencies: 1. Interpersonal Competences 2. Systems Thinking Competencies 3. Anticipatory Competences 4. Normative Competences 5. Strategic Competences	Interpersonal, Technical, Pre-emptive, Normative, and Strategic Competences	Hard and Soft
Sutling, Mansor, Widyarto,	In their work "Understanding of Project Manager Competency in Agile Software Development Project	Knowledge in PM Discipline Behavioural/Person Competencies	

Author	Findings/Output of work/area of work	A summary explanation of findings	Categorization: Hard or soft
Lecthmunan, & Arshad (2015)	(ASDP)", came out with four main competencies needed by a project manager to ensure success in the agile space as: 1. Skill 2. Knowledge 3. Personal Attribute 4. Behavior		
Hanif &Tariq (2014)	Identified some examples of competencies highly desirable in managers as: 1. Team Work 2. Communication 3. Leadership 4. Decision making 5. Organizational Skill	Team, Communication, Leadership, Decision making, and Organizational Competencies	Soft