



SYSTEMATIC LITERATURE REVIEW OF PROJECT MANAGER'S LEADERSHIP COMPETENCIES

Journal:	<i>Engineering, Construction and Architectural Management</i>
Manuscript ID	ECAM-05-2019-0276.R1
Manuscript Type:	Original Article
Keywords:	Project Management, Management, Construction, Methodology, Engineering
Abstract:	

SCHOLARONE™
Manuscripts

SYSTEMATIC LITERATURE REVIEW OF PROJECT MANAGER'S LEADERSHIP COMPETENCIES

ABSTRACT

Purpose:

Over the last few decades, a large number of research studies have been carried out on project manager's leadership competencies. However, systematic literature reviews are still scarce in the project management literature. Therefore, the purpose of this article is to conduct a systematic literature review on project manager's leadership competencies based on published empirical research studies.

Methodology:

We employed a systematic literature review (SLR) methodology to synthesize research in a rigorous manner and a total of 1,780 articles were identified in the first step and a final sample of 60 research studies were synthesized.

Findings:

Synthesis of the findings in this SLR on project manager's leadership competencies revealed: a) there is a lack of categorization or ranking of leadership competencies; b) 20 research studies (46%) were conducted with sample sizes of less than 100; c) only a few research studies (<10%) used interview data for analysis; and d) none of the research studies reported adoption of a triangulation method.

Implications/Limitations:

This study prioritized project manager's leadership competencies as 'high priority', 'moderate priority', and 'low priority'. We recommend a sample size between 200 and 300 to produce sophisticated results and enhance the credibility, generalizability and validity of future research.

Originality:

Future research studies are suggested to consider systematic literature review combined with face-to-face and group interview in addition to employing triangulation methods. Besides highlighting implications for practitioners, this SLR has advanced the understanding of how to conduct systematic literature reviews in a robust manner.

Keywords: Systematic literature review, project manager, leadership, leadership competencies.

SYSTEMATIC LITERATURE REVIEW OF PROJECT MANAGER'S LEADERSHIP COMPETENCIES

1. INTRODUCTION

Competence is an area of work, competency is the behaviour supporting an area of work, and competencies are the attributes underpinning a behaviour (Moore, Cheng, and Dainty, 2002). The topic of project manager's leadership competencies has been cited as a critical success factor for determining either the success or failure of a project, which is an area of much debate in the literature (Nixon et al., 2012). Indeed, leadership competencies have been defined as "a cluster of related knowledge, attitudes, skills, and other personal characteristics that affect a major part of one's job, correlates with performance on the job, can be measured against well-accepted standards, can be improved via training and development, and can be broken down into dimensions of competencies" (Limsila and Ogunlana, 2008). On this matter, Woodruffe (1991) articulated that competence is an ability to perform a task successfully. According to Crawford (2007), the competencies of project management personnel and project success can be closely related to each other. According to the dictionary definition, the word competency and competence are readily interchangeable (Moore et al., 2002). However, the influence of a project manager's leadership competencies in achieving project success appears to have been ignored in most of the project management studies (Turner and Muller, 2005).

Project management is a key skill-set related to the area of engineering, construction and architectural management (Ahuja et al., 1994), since clearly built environment and civil engineering work is designed and delivered according to specified and agreed projects.

Researchers have explored this area from a theoretical perspective, for instance, investigating the

1
2
3 relationship between construction project management theory and transaction cost economics
4
5 (Walker and Kwong Wing, 1999). Other researchers have assessed how to improve the
6
7 performance of the earned value analysis technique as a construction project management tool
8
9 (Howes, 2000) and the development of a diagnostic framework and health check tool for
10
11 engineering and technology projects (Philbin and Kennedy, 2014). Although it has also been
12
13 reported that this sector faces a number of major challenges associated with managing projects as
14
15 identified by Wilkinson (2001), where many of the fundamental problems associated with
16
17 managing construction projects were found to be relationship-based. In this context, new processes
18
19 can be deployed in order to improve the management of relationships on construction projects, e.g.
20
21 through adopting a lean construction management (LCM) model via a number of visual tools in
22
23 order to support the planning and control process in a systematic manner (Brady et al., 2018). Such
24
25 developments in the construction sector do however rest on the ability to enhance the leadership
26
27 competencies of project managers as part of wider soft skills (Zuo et al., 2018), so that they are
28
29 able to adopt and integrate new working practices and ultimately ensure the successful delivery of
30
31 engineering projects.
32
33
34
35
36
37
38
39
40

41 Traditional project management approaches support delivery of the project in accordance with
42
43 schedule, budget, scope, and quality requirements (Kerzner, 2017). However as mentioned
44
45 previously, many authors point to the continued difficulties that projects encounter and especially
46
47 those that involve technological or engineering complexity (Philbin, 2008), for instance in the
48
49 construction engineering (Flyvbjerg, 2007) and IS/IT (information science/information
50
51 technology) sectors (Patanakul, 2014). Consequently, new methodologies have been proposed,
52
53 such as the Shenhar and Dvir (2007) approach of viewing project success from a broader
54
55
56
57
58
59
60

1
2
3 perspective and the need to ensure project management arrangements are tailored to the specific
4 project situation (i.e. related to the contingency theory) since not all projects are the same (Nicholas
5 and Steyn, 2017). Moreover, project success consists of criteria or standards, which assess project
6 results or outcomes (Creasy and Anantatmula, 2013) and include both short-term success (namely
7 cost, schedule, scope and quality) and long-term success (such as customer satisfaction, team
8 satisfaction, organizational success and preparing for future) (Ahmed and Azmi, 2016).
9

10
11
12 A further major trend has been the increasing adoption of agile project management practices
13 (Highsmith, 2009), where a range of agile tools and techniques are applied to ensure project
14 delivery. Although with this approach, there can be a need to change or even reduce the project
15 specification in order for the project to remain on track according to the schedule and budgetary
16 requirements. Nevertheless the agile movement continues to build momentum and the initial
17 technology and industrial applications are now being extended into other sectors, such as managing
18 projects in the higher education sector (Philbin, 2017). Although these approaches provide
19 different perspectives on project management, the role of the project manager, and the leadership
20 skills that are associated with the role remain central to the performance of any project (Müller &
21 Turner, 2007b). Moreover, empirical studies can be pursued to achieve this goal but an important
22 approach to properly probe and survey the current state of knowledge in a specific area is to adopt
23 a systematic literature review.
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49

50 The literature review is an important tool for research in order to manage the diversity of
51 knowledge arising from an academic inquiry (Tranfield et al., 2003). In contrast, a Systematic
52 Literature Review (SLR) differs from traditional literature reviews, since the method adopts a
53
54
55
56
57
58
59
60

1
2
3 scientific, transparent and repeatable process to mitigate bias and provide an audit trail for the
4 conclusions of the study. According to Klassen et al. (1998, p. 700), a systematic literature review
5 is “a review in which a comprehensive search for relevant studies on a specific topic, and those
6 identified are then appraised and synthesized according to a pre-determined explicit method”.
7
8 Consequently, the SLR approach provides clarity, transparency, and impartiality as well as
9 inclusive coverage in a particular area (Thorpe et al., 2005). SLRs are used for comprehensive,
10 objective, and systematic reporting of previous research studies and are often contrasted with
11 traditional literature reviews (Weed, 2005). Furthermore, Parris and Peachey (2013) have argued
12 that there is a current knowledge gap in regard to how to conduct an effective systematic literature
13 review, how to integrate the arising conclusions, and how to critically assess studies through
14 synthesis of the findings. It is therefore critical when using the SLR approach to ensure a rigorous
15 treatment of the literature results is achieved, thereby maintaining the empirical nature of the
16 technique and also allowing synthesis of the findings to generate outputs and insightful findings
17 that adequately further the scope of the literature in the area of interest.
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37

38 In the field of the project manager’s leadership competencies, systematic literature reviews are
39 limited. Therefore, in this paper, we identified different criterion words from the literature that
40 were searched through selecting appropriate databases on project manager’s leadership
41 competencies. The systematic literature review of project manager’s leadership competencies
42 reveals that two dominant review studies have been conducted during the last decade; firstly by
43 Turner and Müller (2005) on the project manager’s leadership style as a project success factor, and
44 secondly by Nixon et al. (2012) on the significance of project manager’s leadership performance
45 towards project success or failure. Apart from these two review studies, there is presently a scarcity
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3 of articles synthesizing research studies on project manager's leadership competencies and/or
4 styles. Conversely and during the last decade systematic literature reviews were conducted by
5
6 León and Farris (2011) and Hoppmann et al. (2011) that focused on the subject of lean product
7
8 development. Systematic literature reviews are therefore a recognized methodology in order to
9
10 investigate a field and allow scholars to survey the current and emerging trends in a given area.
11
12
13
14
15
16
17

18 Müller and Turner (2007b) previously conducted a study on 'matching the project manager's
19
20 leadership style to project type' and used three types of leadership competencies (namely
21
22 intellectual, managerial and emotional) to measure leadership style. Leadership competencies are
23
24 a combination of knowledge, skills, and personality characteristics that leads to superior results
25
26 (Crawford, 2007), while leadership style is a joint outcome of the leader's personal traits, self-
27
28 related cognitive information, and the underlying motives to understand operation situation (Toor
29
30 & Ofori, 2006). Nevertheless, Müller and Turner (2007b) used leadership competencies as the
31
32 focus of their work but concluded that the project manager's leadership style influences project
33
34 success, and different leadership styles may be appropriate for different types of projects. These
35
36 assertions potentially create a misunderstanding in the literature regarding the apparent disparity
37
38 between leadership competencies and leadership styles. In order to avoid this situation, both terms
39
40 can be used interchangeably.
41
42
43
44
45
46
47
48

49 A literature review was conducted by Turner and Müller (2005) on whether the project manager's
50
51 leadership style is a success factor for projects, and whether its impact can be different for different
52
53 types of projects. They found that the literature on project success factors did not typically cite the
54
55 project manager's leadership style or competencies as a critical success factor for projects.
56
57
58
59
60

1
2
3 Although the Turner and Müller (2005) study was comprehensive through focusing on the project
4 manager's leadership styles, it was not however based on use of the systematic literature review
5 methodology. Conversely, Hollenbeck et al. (2006) discussed models for leadership competencies,
6 but were limited to theoretical assumptions since the objective of the study was neither to develop,
7 test or validate any specific model for leadership competencies. The Nixon et al. (2012) study was
8 limited to exploring how the performance of project manager's leadership determines the project
9 outcomes. Thus, the SLR method has not been employed to conduct studies on project manager's
10 leadership competencies, nor prioritize leadership competencies of a project manager. Therefore,
11 the SLR study reported here was designed to fill these gaps and address the following research
12 questions: a) Which leadership competencies of the project manager have been investigated and
13 what is their frequency in literature? b) Do project manager's leadership competencies have any
14 category or priority in the literature? c) Are there any limitations of research methods and sample
15 size in published empirical studies? and d) What are the key implications for academicians and the
16 practicing project manager based on these research studies?
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38

39 The SLR study reported here significantly contributes to the existing body of knowledge on
40 construction, engineering and project management as earlier review studies related to project
41 manager's leadership were only focused on certain more narrow aspects. Namely, identifying
42 leadership competencies including personality and leadership styles of the project manager as a
43 success factor for projects; suggesting that different competency profiles are appropriate for
44 different types of projects (Turner and Müller, 2005); and exploring how leadership performance
45 in project management can determine project outcomes (Nixon et al., 2012). Although these
46 review studies emphasized researchers' efforts to conceptualize and operationalize project
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3 manager's leadership competencies, however, none of the review studies were based on the SLR
4 methodology. Therefore, this study aims to bridge the gap through utilizing the SLR methodology
5
6 to synthesize project manager's leadership competencies based on published empirical research
7
8 studies. The focus of this research study was to evaluate only empirical research so as to provide
9
10 a comprehensive perspective on project manager's leadership competencies, while ensuring the
11
12 studies represent the latest developments and therefore provide a view on the 'state of the art' of
13
14 the field.
15
16
17
18
19
20

21 The structure of this paper is as follows. Firstly, there is a summary of the origins of project
22
23 manager's leadership competencies in order to generate the aforementioned research questions
24
25 based on relevant theory. This is accompanied by further introductory material on project
26
27 management challenges in the context of project manager's leadership competencies. Then, a
28
29 summary of the systematic literature review method is provided, including details of the exclusion
30
31 and inclusion criteria, databases searched, searched items, research design, sample size, and matrix
32
33 method. Next, the article presents the analysis of research studies followed by discussion of
34
35 findings of the systematic literature review on project manager's leadership competencies that is
36
37 derived from 60 research studies. Thereafter, the article explains the methodological contribution
38
39 of the systematic literature review method in the field of project management. Finally, the
40
41 conclusions are presented, including implications, limitations, and suggestions for future research.
42
43
44
45
46
47
48

49 **2. METHODS**

50 **2.1 Searched Keywords**

51
52
53
54
55
56
57
58
59
60

The published articles investigating project manager's leadership, leadership competencies, leadership styles, or related areas were searched from different databases. Following the Padalkar and Gopinath (2016) approach, the focus of the searches was limited to titles and abstracts of articles published in the project management literature and this was done in order to ensure that the articles included an adequate level of detail on project management and associated leadership competencies. As suggested by de Araújo, Alencar, and de Miranda Mota (2017), an initial search was performed through various databases based on different keywords, including the following: "leadership competencies", "leadership styles", "project leadership", "project manager's leadership", "leadership competencies and styles", "project manager's leadership competency", "project manager's leadership style", and "leadership and project success". The numbers of publications per keywords in each bibliographic database are provided in Table 1.

Insert Table 1. Number of publications per keyword searched from bibliographic databases

2.2 Searched Databases

The search for published articles was conducted in a systematic manner following the order of listed databases and according to the aforementioned keywords and key phrases based on the methodologies of Busalim (2016) and de Araújo, Alencar, and de Miranda Mota (2017). The systematic literature review included searching in the following electronic databases: Cambridge Journals, EBSCOHOST, Emerald, IEEE, JSTOR, SAGE Journals, Science Direct, Scopus, Taylor and Francis, Web of Science, and Wiley Online. The published titles and abstract of articles were reviewed by the researchers for inclusion in this research study. Furthermore, all search results were limited to peer-reviewed journal articles published in English.

2.3 Research Design

Abstracts were retained for the following steps in the research study if they included the terms: a) project manager's leadership; b) leadership competencies, or project manager's leadership competencies; c) leadership styles or project manager's leadership styles; d) project leadership reference to project success, project performance, or organizational performance. This method ensured that the publications had the necessary coverage of project manager's leadership competencies. Abstracts satisfying these criteria were ranked as one (1), or two (2), according to the significance of the content and empirical results. Following the methods by Ali and Miller (2017) and Igarashi, de Boer, and Fet (2013), a number of steps followed and the appropriate ranking criteria that were used during the abstract and the article selection process, which are illustrated in Figure 1. Based on this initial review, articles with non-relevant results or those containing searched keywords only in the background or discussion were ranked at three (3) and subsequently excluded. The rank one (1) and two (2) abstracts were reviewed in detail and retained for complete review of the articles based on the presence of the key terms, i.e. project manager's leadership, leadership competencies, styles, or project leadership in all major sections of articles.

Insert Figure 1. Research design flow chart for systematic literature review (SLR)

2.4 Exclusion and Inclusion Criteria

We followed the Igarashi, de Boer, and Fet (2013) methodology to develop exclusion and inclusion criteria for selection of the articles. The initial search required that the articles included in the review were studies that must: i) be published in the English Language; ii) be published in peer

1
2
3 reviewed journal; iii) be related to the construction, engineering or project management area; and
4
5 iv) include the specific searched keywords. The corresponding numbers of articles found using
6
7 specific keywords in a given period of time from each database are summarized in Table 1. In the
8
9 next step, the researcher scrutinized if there were any duplicate publications from the databases
10
11 that were searched. Next, the researcher recorded the number of duplicates, and then deleted the
12
13 duplicated journal articles from the last database searched in order to keep a record of total new
14
15 articles found.
16
17
18
19
20
21

22 The second screening process was conducted to assess the eligibility against inclusion criteria, and
23
24 then full text articles matching the inclusion criteria were retrieved from the corresponding
25
26 databases. The inclusion criteria for the second screening required that: i) the published papers
27
28 should be peer reviewed articles, ii) the papers should discuss project manager's leadership terms
29
30 in the title or abstract, and iii) the papers examine project manager's leadership theory either
31
32 qualitatively or quantitatively. Articles were excluded if any of these inclusion criteria were not
33
34 found in the abstract, results, or discussion sections.
35
36
37
38
39

40 **2.5 Sample Size**

41
42 We adopted the procedure developed by Ali and Miller (2017) and the key terms outlined in the
43
44 inclusion and exclusion criteria section were used to identify peer reviewed articles. The large
45
46 number of papers identified using searched terms from different databases confirmed that there
47
48 has been a surge of interest in this matter in the project management literature. A total of 1,780
49
50 articles were retrieved from searching the databases and 364 articles were selected based on title
51
52 analysis following the methodology of Igarashi, de Boer, and Fet (2013). Then, we conducted
53
54
55
56
57
58
59
60

1
2
3 abstract analysis and removed 162 irrelevant articles. Further, 58 duplicates were deleted and there
4
5 remained 144 articles matching the initial inclusion criteria. Afterwards, 26 articles were excluded
6
7 based on inclusion and exclusion criteria, i.e. they did not match the aim of this study. A sample
8
9 of 118 articles was obtained after screening in accordance with the stated inclusion and exclusion
10
11 criteria. Then, 58 articles were excluded based on irrelevancy found during text analysis of
12
13 complete articles, due to the area of focus not being on the subject of project manager's leadership
14
15 competencies. As a result, a final sample of 60 articles was identified for the full review process
16
17 in order to synthesize the research studies, which met the inclusion criteria for the systematic
18
19 literature review on project manager's leadership competencies. Out of these 60 articles, we found
20
21 44 empirical studies and 16 theoretical studies during the complete review process, which were
22
23 drawn from a variety of peer reviewed journals for detailed review. A summary of the publications
24
25 from the systematic literature review is provided in Table 2.
26
27
28
29
30
31
32

33 **Insert** Table 2. Summary of the publications from the systematic literature review
34
35
36
37

38 **3. ANALYSIS**

39
40
41

42 The matrix method suggested by Garrard (2013) was employed as the strategy for organizing and
43
44 abstracting pertinent information from the publications. Consequently, the following information
45
46 was abstracted from each article: (a) the types of leadership competencies based on the findings of
47
48 the research studies (b) the types of research methods and sample sizes used in the studies? (c) the
49
50 main respondents and the origin of the research studies? and (d) the sample size of each empirical
51
52 study. As a result, 60 research studies were identified and synthesized through use of the matrix
53
54 method. A summary of the year of publication for these articles is shown in Figure 2.
55
56
57
58
59
60

1
2
3
4
5
6 **Insert** Figure 2. Summary of the year of publication for the articles from the SLR
7
8
9

10 Analysis of the literature review findings from a broader perspective reveals that project manager
11 leadership competencies is an area of concern for project stakeholders regarding performance
12 improvement. Similarly, there is a growing interest to identify the leadership competencies or
13 styles that are more suited to a project manager and in certain situations, i.e. related to contingency
14 theory. Indeed according to Hollenbeck et al. (2006), the current state of knowledge and theories
15 may not be extensive enough to build a strong model for leadership competencies that can specify
16 the most effective interactions between project stakeholders and the corresponding situations. The
17 majority of research on the project manager's leadership competencies consists of developing and
18 validating theoretical frameworks, and establishing measurement tools with the intention that
19 future scholars can apply these tools to explore project manager's leadership competencies in
20 practice. However, a limited amount of research has been undertaken in order to synthesize the
21 literature on project manager's leadership competencies. Therefore, the present review was
22 explicitly targeted to explore research studies on project manager's leadership competencies, as
23 evidenced from Table 3.
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44

45 **Insert** Table 3. Summary of the systematic literature review on project manager's leadership
46 competencies.
47
48
49
50
51

52 Leadership competencies are gaining recognition both in academia and industry. In practice,
53 leadership competencies or their combination vary from person-to-person and project-to-project,
54
55
56
57
58
59
60

1
2
3 and of course this is a feature of the working environment and the people involved. According to
4
5 the research findings, the popularity of project manager's leadership competencies based on the
6
7 systematic literature review method is illustrated in Figure 3. This analysis shows the resulting
8
9 graph for project manager's leadership competencies through analysis of the 44 empirical studies.
10
11 Each axis on the graph represents a specific leadership competency identified through synthesis of
12
13 this SLR and the corresponding frequency from the literature. On the basis of this synthesis we
14
15 classified leadership competencies in the following order (starting with the highest first and
16
17 decreasing in order thereafter): communication (14), developing/growth (13), achieving (12),
18
19 critical analysis (12), empowering (12), managing resources (12), strategic perspective (12),
20
21 conscientiousness (11), engaging (11), influence (11), motivation (11), sensitivity (11), vision and
22
23 imagination (11), emotional resilience (10), intuitiveness (10), self-awareness (10), attentiveness
24
25 (5), managerial expertise (5), knowledge sharing (5), effectiveness (3), administrative expertise
26
27 (3), teamwork (3), PM expertise (3), monitor (3), producer (3), cognitive ability (2), decision
28
29 making (2), helping relationship (2), managing conflict (2), facilitator (2), innovator (2), integrator
30
31 (2), task proficient (2), extraversion (1), openness (1), mentor (1), broker (1), coordinator (1),
32
33 director (1), interpersonal skills (1), experience (1), communicating expectations (1), defining roles
34
35 and responsibilities (1), establishing trust (1), and personal characteristics (1). For further details
36
37 on the top-rated leadership competencies see Appendix A.
38
39
40
41
42
43
44

45 **Insert** Figure 3. Popularity of project manager's leadership competencies based on SLR
46
47
48
49

50 Since the focus of this research study was to gain an insight into the research studies that focus on
51
52 the project manager's leadership competencies, we excluded those studies that did not meet this
53
54 criterion. The approach adopted in this review entails extensive searches of relevant databases with
55
56
57
58
59
60

1
2
3 the intension of ensuring, as much as possible, that relevant literature on project manager's
4 leadership competencies was identified. The findings of the systematic literature review allowed
5 synthesis of the research methods used in 44 empirical studies, which are summarized and placed
6 into a matrix, as given in Table 4.
7
8
9
10
11
12
13

14 **Insert** Table 4. Summary of research methods of systematic literature review studies.
15
16
17
18

19 This SLR research study consists of a synthesis of 60 research studies. In these articles, leadership
20 competencies or styles (i.e. the terms) have often been used and sometimes both terms have been
21 used interchangeably to measure these concepts. Most of the studies showed a significant
22 association between leadership competencies (or styles) and project performance. A few studies
23 demonstrated a significant relationship between leadership competencies and project success or
24 project management success, which is shown from a synthesis of project manager's leadership
25 competencies along with authors and years of publication, as presented in Table 3. Moreover,
26 project manager's leadership competencies identified from evaluation of this SLR are placed in
27 different clusters (see Figure 4).
28
29
30
31
32
33
34
35
36
37
38
39
40
41

42 **Insert** Figure 4. Clusters of project manager's leadership competencies.
43
44
45
46

47 From the 60 articles considered as part of the systematic literature review, 44 research studies
48 included in this SLR used a variety of sample sizes ranging from less than 50 to above than 1,000.
49 In regard to sample size of the reviewed articles, there were 14% studies with less than 50
50 respondents as sample, 32% having samples between 50 and 100, 23% studies with a sample of
51
52
53
54
55
56
57
58
59
60

1
2
3 more than 100 and less than 200, 20% studies with a sample between 300 and 500, 9% studies
4
5 having a sample size between 500 and 1,000, and only 2% studies having greater than 1,000 sample
6
7 size. For further explanation, graphical depiction of sample size used in these research studies is
8
9 shown in Figure 5.
10
11

12
13 **Insert** Figure 5. Graphical depiction of sample size of SLR studies.
14
15

16
17
18 Most of the studies measured leadership competencies or styles by using validated or study-
19
20 specific questionnaires, or structured interviews. Leadership competencies and styles were mostly
21
22 measured by adopting a validated questionnaire such as a leadership dimension questionnaire
23
24 (LDQ) and multifactor leadership questionnaire (MLQ), or alternatively with adapted/newly
25
26 developed questionnaires or through conducting interviews. Project success was generally
27
28 measured using a self-reported questionnaire including project success assessment questionnaire
29
30 (PSAQ), which is a standard and well-accepted way of measuring this outcome. The investigative
31
32 methods to find relationships used in these studies were varied in terms of the tests used and their
33
34 complexity. The majority of studies used a statistical test, such as Spearman's correlation, simple
35
36 regression, hierarchical regression, and structural equation models, while a few studies did not
37
38 report any significant method for testing hypotheses on the directions or the nature of the
39
40 relationship. A small number of research studies (<10%) conducted interviews to enable data
41
42 analysis and none of the research studies reported adoption of the triangulation method.
43
44
45
46
47
48
49

50 The specific search items used to identify articles in this SLR emphasized that there has been a
51
52 surge of interest in the area of project manager's leadership competencies. A total of 202 articles
53
54 were selected based on review of their abstracts and titles containing the searched key items. The
55
56
57
58
59
60

1
2
3 review of the literature shows that a considerable amount of research has been conducted on project
4 manager's leadership competencies or styles, but a limited number of review studies have been
5 conducted during the last decade to synthesize research studies on project manager's leadership
6 competencies. The review of 60 research studies revealed that: a) there is an ambiguity with
7 respect to competencies and styles when both terms are interchangeably used to capture and define
8 project manager's leadership, b) leadership competencies have not been categorized or prioritized,
9 c) researchers used multiple but limited measurement tools and methods to examine the influence
10 of project manager's leadership competencies, and d) there is no standard sample size for
11 conducting both qualitative and quantitative studies to support a robust analysis via use of an
12 appropriate software package, e.g. SPSS, AMOS, PLS, and NVIVO.
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27

28 **4. DISCUSSION OF THE FINDINGS**

29
30
31
32 Earlier review studies conducted in the field of project management were limited to certain areas,
33 for instance to project manager's leadership style as a critical success factor (Turner and Müller,
34 2005), performance of project manager's leadership (Nixon et al., 2012), discussion on leadership
35 competencies model (Hollenbeck et al., 2006), lean product development (León and Farris, 2011),
36 and lean product framework development (Hoppmann et al., 2011). This SLR study has explored
37 the application of the systematic literature review method to the case of project manager's
38 leadership competencies based on published empirical research studies. The possibilities of
39 generalization of this study results may potentially be limited to the diversity in definitions, SLR,
40 study designs, and measurement methods used for leadership competencies, styles, and project
41 success, as well as the variability in the methods used to evaluate the association in terms of tests
42 and complexity. We made significant effort to prioritize project manager's leadership
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3 competencies, synthesized in this SLR, based on their frequency identified from the empirical
4
5 research studies. We categorized and prioritized these leadership competencies into three
6
7 categories as “high priority”, “moderate priority”, and “low priority”, based on means of
8
9 frequencies, as presented in Table 5.
10
11
12
13
14

15 **Insert** Table 5. Summary of categorization criteria and priority levels matrix.
16
17
18
19

20 This SLR reveals that a number of terms have been used widely in the literature in the context of
21
22 project manager’s leadership, which includes competencies, styles, profiles, dimensions, roles, and
23
24 factors. These terms having different concepts and meanings but are being used simultaneously in
25
26 the literature regarding project manager’s leadership, and this adds a further complication and
27
28 challenge in regard to interpreting the results from the SLR. In many cases the previous literature
29
30 has disregarded the need to clearly differentiate between the leadership competencies and styles
31
32 of a project manager as limited evidence has been found from the synthesized literature. In order
33
34 to clarify these contentions, a study conducted by Ahmed and Azmi (2016) differentiated between
35
36 leadership competencies and styles, and the study concluded that both leadership competencies
37
38 and styles are different. Therefore, these terms need to be clearly understood and used by the
39
40 researcher and project manager to avoid uncertainty arising when interpreting the literature and to
41
42 support effective strategies for ensuring project outcomes are fully realized.
43
44
45
46
47
48

49 A number of studies included in the SLR reported that project manager’s leadership competencies
50
51 are often correlated with project success and different leadership competencies may be appropriate
52
53 for different types of projects. Project success is measured through short-term and long-term
54
55
56
57
58
59
60

benefits, so project managers should devote increasing energies into rich communication both within the project and project environment (Andersen et al. 2006). Consequently, a relationship-oriented project manager should be well suited to deliver complex projects. Also, the rich and quality experience as well as positive attitude a project manager possesses can lead to higher chances of project success. The systematic literature review reported here fills the current knowledge gap, allows structured analysis and provides critical synthesis of findings that are relevant to project managers in the construction sector. In agreement with Parris and Peachey (2013), we not only ascertain the current state of the field in project manager's leadership competencies research and the synthesis of divergent studies in this systematic literature review but we have also advanced a rigorous methodology for conducting a systematic literature review.

5. CONCLUSIONS

Planning and organizing skills are significantly important for an engineering project manager to achieve the project objectives of delivery according to budget, schedule, scope, and quality requirements. This is especially the case for projects from the built environment and civil engineering sector. Synthesis of leadership competencies has revealed that communication and developing teams are the most critical for the project manager. These skills are important for a project manager to effectively and efficiently manage the engineering project team members and other key project stakeholders who have a vested interest in the outcomes of any engineering project. This SLR reveals that a project manager possessing certain leadership competencies does not necessarily guarantee the successful delivery of engineering projects. However, adoption of critical leadership competencies (such as communication, developing/growth, achieving, critical analysis, empowering, managing resources, organizational/strategic planning, etc.) by the project

1
2
3 manager should improve the probability of project success and help to mitigate project risks.
4
5 Moreover, the success, or failure, of any project will be contingent on the specific project
6
7 circumstances as well as less tangible aspects, such as the attitude adopted by the project manager,
8
9 willingness to accept and respond to unforeseen changes as well as personal resilience.
10
11 Nevertheless, our research has identified through empirical research the most popular leadership
12
13 competencies for a project manager. These leadership competencies are particularly needed by
14
15 project managers engaged on construction and engineering projects where project complexity is
16
17 high and there are difficult issues and risks that arise. The need for enhanced leadership
18
19 competencies in the construction sector is envisaged to continue and especially in the context of
20
21 the adoption of new technologies associated with new adaptations of BIM and Industry 4.0; the
22
23 subsequent technical complexity will require strong leadership competencies across engineering
24
25 projects to ensure the benefits provided by such technologies can be realised.
26
27
28
29
30
31
32

33 This study has addressed the aforementioned research questions. Project manager's leadership
34
35 competencies have been synthesized and their frequencies have been reported (research question
36
37 a). Project manager's leadership competencies have been categorized (research question b).
38
39 Limitations have been identified for the research methods and sample sizes from studies included
40
41 in SLR (research question c). The key implications for academicians and the practicing project
42
43 manager from the engineering and construction sector have been synthesized based on the research
44
45 studies from the SLR (research question d).
46
47
48
49
50
51

52 This paper has directed efforts to build a chronology of project manager's leadership competencies
53
54 by synthesizing extensive literature to contribute towards the associated body of knowledge and
55
56
57
58
59
60

1
2
3 to enhance our understanding for establishing linkages between project manager's leadership
4 competencies and project outcomes. This work has been positioned in the context of engineering
5 projects and the construction sector. This systematic literature review of the 60 research studies
6 provides evidence regarding the influence of project manager's leadership competencies on
7 engineering projects. The subsequent analysis of available data from the systematic literature
8 review suggests that greater levels of leadership competencies are associated with improved
9 project performance leading to project success. However, future directions suggested by such
10 empirical studies have not yet been significantly addressed and therefore, further research in this
11 area is needed. Although we conducted this SLR in a disciplined manner, there are potential
12 limitations in terms of the measurement methods, study designs, and inconsistency in the results
13 of SLR studies. This SLR has been limited to searching indexed journals available in the selected
14 databases, which were peer-reviewed and the articles were written in English language. There may
15 be research studies on project manager's leadership competencies published in other languages
16 that would contradict or complement some of the conclusions drawn from this SLR.
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37

38 This SLR was limited to the literature on project manager's leadership competencies published in
39 peer-review journals. Future studies are suggested to consider conducting the SLR method on
40 leadership competencies other than the projects field to highlight its significance. Also, most of
41 the empirical studies used cross-sectional study design and the Likert scale for measurement,
42 which limits the analysis of the association between leadership competencies, or styles, and project
43 success. The analysis of sample size in this SLR studies reveals that two-thirds of empirical
44 research studies (69%) conducted at a country/regional level were limited to a sample of less than
45 200 responses, therefore, we recommend a sample size between 200 and 300 in order to enhance
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3 the credibility and validity of future research, ensure generalizability of results at country/regional
4 level, and produce sophisticated results using variety of analysis software. Furthermore, we
5 prioritized leadership competencies as ‘high priority’, ‘moderate priority’, and ‘low priority’ that
6 might be useful in managing complex, large, and small projects, which should be considered by
7 future research studies to further investigate and validate the effectiveness of these priorities on
8 different types of projects.
9
10
11
12
13
14
15
16
17
18

19 The lack of ranking and prioritisation of leadership competencies that are easier or harder to
20 develop in the architectural, construction engineering and project management environment is one
21 of the limitations of this SLR, which is a recommended area for future research. Furthermore, as
22 the aim of this study was to synthesize project manager’s leadership competencies based on
23 research studies including both empirical studies (44) and theoretical studies (16); however,
24 separate SLRs of empirical and theoretical studies were not part of this study due to word count
25 and other constraints. Thus, an autonomous SLR of both empirical and theoretical studies may be
26 a further fruitful area for future research. Additionally, we suggest conducting interviews and focus
27 group discussions with construction, engineering and project management practitioners to provide
28 future research studies with more validity and reliability. Employing a systematic literature review
29 combined with engineering practitioner face-to-face and group interviews (i.e. a mixed method)
30 would allow triangulation to take place, thereby providing a robust research approach to be
31 employed in future research studies.
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

REFERENCES

- Ahadzie, D., Proverbs, D., & Sarkodie-Poku, I. (2014). Competencies required of project managers at the design phase of mass house building projects. *International Journal of Project Management*, 32(6), 958-969.
- Ahmed, R., & Anantatmula, V. S. (2017). Empirical Study of Project Manager's Leadership Competence and Project Performance. *Engineering Management Journal*, 29(3), 1-16.
- Ahmed, R., & bin Mohamad, N. A. (2014). Mapping Project Manager's Leadership Competencies and Styles to Project Success: A Theoretical Framework. *The Journal of Modern Project Management*, 2(2), 39-54.
- Ahmed, R., & Mohamad, N. A. B. (2016). Differentiating between leadership competencies and styles: A critical review in project management perspective. *International Journal of Information Technology Project Management*, 7(1), 58-71.
- Ahuja, H. N., Dozzi, S. P., & Abourizk, S. M. (1994). *Project management: techniques in planning and controlling construction projects*. John Wiley & Sons.
- Ali, M., & Miller, L. (2017). ERP System Implementation in Large Enterprises-A Systematic Literature Review. *Journal of Enterprise Information Management*, 30(4), 666-692.
- Anantatmula, V. S. (2010). Project Manager Leadership Role in Improving Project Performance. *Engineering Management Journal*, 22(1), 13-22.
- Anantatmula, V. S., & Thomas, M. (2010). Managing Global Projects : A Structured Approach for Better Performance. *Project Management Journal*, 41(2), 60-72.
- Andersen, E. S. (2016). Do project managers have different perspectives on project management? *International Journal of Project Management*, 34(1), 58-65.
- Andersen, E. S., Birchall, D., Jessen, S. A., & Money, A. H. (2006). Exploring project success. *Baltic Journal of Management*, 1(2), 127-147.
- Aronson, Z. H., Reilly, R. R., & Lynn, G. S. (2006). The impact of leader personality on new product development teamwork and performance: The moderating role of uncertainty. *Journal of Engineering and Technology Management*, 23(3), 221-247.
- Avolio, B. J., Reichard, R. J., Hannah, S. T., Walumbwa, F. O., & Chan, A. (2009). A meta-analytic review of leadership impact research: Experimental and quasi-experimental studies. *Leadership Quarterly*, 20(5), 764-784.
- Bakar, A. H. A., Razak, A. A., Abdullah, S., & Awang, A. (2009). Project Management Success Factors for Sustainable Housing : A Framework. *Asian Journal of Management Research*, 1(1), 66-80.

- 1
2
3 Battilana, J., Gilmartin, M., Sengul, M., Pache, A. C., & Alexander, J. A. (2010). Leadership
4 competencies for implementing planned organizational change. *The Leadership Quarterly*,
5 21(3), 422-438.
6
7 Blaskovics, B. (2016). The impact of project manager on project success—The case of ICT sector.
8 *Society and Economy in Central and Eastern Europe*, 38(2), 261-281.
9
10 Brill, J. M., Bishop, M., & Walker, A. E. (2006). The competencies and characteristics required
11 of an effective project manager: A web-based Delphi study. *Educational Technology*
12 *Research and Development*, 54(2), 115-140.
13
14 Brady, D. A., Tzortzopoulos, P., Rooke, J., Formoso, C. T., & Tezel, A. (2018). Improving
15 transparency in construction management: a visual planning and control model.
16 *Engineering, Construction and Architectural Management*, 25(10), 1277-1297.
17
18 Busalim, A. H. (2016). Understanding social commerce: A systematic literature review and
19 directions for further research. *International Journal of Information Management*, 36(6),
20 1075-1088.
21
22 Chan, A. T. S., & Chan, E. H. W. (2005). Impact of Perceived Leadership Styles on Work
23 Outcomes : Case of Building Professionals. *Journal of Construction Engineering and*
24 *Management*, 131(4), 413-422.
25
26 Christenson, D., & Walker, D. H. T. (2008). Using vision as a critical success element in project
27 management. *International Journal of Managing Projects in Business*, 1(4), 611-622.
28
29 Clarke, N. (2010). Emotional Intelligence and Its Relationship to Transformational Leadership and
30 Key Project Manager Competencies. *Project Management Journal*, 41(2), 5-20.
31
32 Conforto, E. C., Amaral, D. C., da Silva, S. L., Di Felippo, A., & Kamikawachi, D. S. L. (2016).
33 The agility construct on project management theory. *International Journal of Project*
34 *Management*, 34(4), 660-674.
35
36 Crawford, L. H. (2007). *Developing the project management competence of individuals*. In:
37 *Turner, J.R., (Ed.), Gower handbook of Project Management*. Aldershot, UK: Gower
38 Publishing.
39
40 Creasy, T., & Anantatmula, V. S. (2013). From every direction—How personality traits and
41 dimensions of project managers can conceptually affect project success. *Project*
42 *Management Journal*, 44(6), 36-51.
43
44 Curran, C. S., Niedergassel, B., Picker, S., & Leker, J. (2009). Project leadership skills in
45 cooperative projects. *Management Research News*, 32(5), 458-468. de Araújo, M. C. B.,
46 Alencar, L. H., & de Miranda Mota, C. M. (2017). Project procurement management: A
47 structured literature review. *International Journal of Project Management*, 35(3), 353-377.
48
49
50
51
52
53
54
55
56
57
58
59
60

- 1
2
3 Dolfi, J., & Andrews, E. J. (2007). The subliminal characteristics of project managers: An
4 exploratory study of optimism overcoming challenge in the project management work
5 environment. *International Journal of Project Management*, 25(7), 674-682.
- 6
7 Dulewicz, V., & Higgs, M. (2005). Assessing leadership styles and organisational context. *Journal*
8 *of Managerial Psychology*, 20(2), 105-123.
- 9
10 Eweje, J., Turner, R., & Müller, R. (2012). Maximizing strategic value from megaprojects: The
11 influence of information-feed on decision-making by the project manager. *International*
12 *Journal of Project Management*, 1-13. 30(6), 639-651.
- 13
14
15 Flyvbjerg, B. (2007). Policy and planning for large-infrastructure projects: problems, causes,
16 cures. *Environment and Planning B: Planning and Design*, 34(4), 578-597.
- 17
18 Fung, H. P. (2014). Relationships between leadership roles and project team effectiveness as
19 perceived by project managers in Malaysia. *Journal of Empirical Studies*, 1(1), 1-22.
- 20
21 Galvin, T., Gibbs, M., Sullivan, J., & Williams, C. (2014). Leadership Competencies of Project
22 Managers: An Empirical Study of Emotional, Intellectual, and Managerial Dimensions.
23 *Journal of Economic Development, Management, IT, Finance & Marketing*, 6(1), 35-60.
- 24
25
26 Garrard, J. (2013). *Health sciences literature review made easy*: Jones & Bartlett Publishers.
- 27
28 Gentry, W. A., & Sparks, T. E. (2012). A Convergence/Divergence Perspective of Leadership
29 Competencies Managers Believe are Most Important for Success in Organizations: A
30 Cross-Cultural Multilevel Analysis of 40 Countries. *Journal of Business and Psychology*,
31 27(1), 15-30.
- 32
33 Geoghegan, L., & Dulewicz, V. (2008). Do Project Managers' Leadership Competencies
34 Contribute to Project Success? . *Project Management Journal*, 39(4), 58-67.
- 35
36
37 Gilley, A., Gilley, J. W., McConnell, C. W., & Veliquette, A. (2010). The Competencies That
38 Effective Managers Use to Build Teams: An Empirical Study. *Advances in Developing*
39 *Human Resources*, 12(1), 29-45.
- 40
41 Highsmith, J. (2009). *Agile project management: creating innovative products*: Pearson
42 Education.
- 43
44 Hollenbeck, G. P., McCall, M. W., & Silzer, R. F. (2006). Leadership Competencies Models. *The*
45 *Leadership Quarterly*, 17(4), 398-413.
- 46
47 Howes, R. (2000). Improving the performance of Earned Value Analysis as a construction project
48 management tool. *Engineering, Construction and Architectural Management*, 7(4), 399-
49 411.
- 50
51
52 Hoppmann, J., Rebentisch, E., Dombrowski, U., & Zahn, T. (2011). A Framework for Organizing
53 Lean Product Development. *Engineering Management Journal*, 23(1), 3-15.
- 54
55
56
57
58
59
60

- 1
2
3 Igarashi, M., de Boer, L., & Fet, A. M. (2013). What is required for greener supplier selection? A
4 literature review and conceptual model development. *Journal of Purchasing and Supply*
5 *Management*, 19(4), 247-263.
6
7 Ika, L., & Saint-Macary, J. (2012). The Project Planning Myth in International Development.
8 *International Journal of Managing Projects in Business*, 5(3), 1-34.
9
10 Jugdev, K., & Müller, R. (2005). A Retrospective Look at Our Evolving Understanding of Project
11 Success. *Project Management Journal*, 36(4), 19-31.
12
13 Kerzner, H. (2017). *Project management: a systems approach to planning, scheduling, and*
14 *controlling*. John Wiley & Sons.
15
16 Kaulio, M. (2008). Project leadership in multi-project settings: Findings from a critical incident
17 study. *International Journal of Project Management*, 26(4), 338-347.
18
19 Khanaposhtayi, Q. F., & Abyane, M. B. (2015). Presenting Competence Profile of Successful
20 Project Managers Based on Fuzzy Analytic Analysis Process (FAHP). *Journal of Applied*
21 *Environmental and Biological Sciences*, 4(5), 70-81.
22
23 Klassen, T. P., Jadad, A. R., & Moher, D. (1998). Guides for reading and interpreting systematic
24 reviews: I. Getting started. *Archives of Pediatrics and Adolescent Medicine*, 152(7), 700-
25 704.
26
27 Kuen, C. W., Zailani, S., & Fernando, Y. (2009). Critical factors influencing the project success
28 amongst manufacturing companies in Malaysia. *African Journal of Business Management*,
29 3(1), 16-27.
30
31 Larsson, J., Eriksson, P. E., Olofsson, T., & Simonsson, P. (2015). Leadership in civil engineering:
32 Effects of project managers' leadership styles on project performance. *Journal of*
33 *Management in Engineering*, 31(6), 401-411.
34
35 León, H. C. M., & Farris, J. A. (2011). Lean Product Development Research: Current State and
36 Future Directions. *Engineering Management Journal*, 23(1), 29-51.
37
38 Limsila, K., & Ogunlana, S. O. (2008). Linking Personal Competencies with Transformational
39 Leadership Style Evidence from the Construction Industry in Thailand. *Journal of*
40 *Construction in Developing Countries*, 13(1), 27-50.
41
42 Lloyd-Walker, B., & Walker, D. (2011). Authentic leadership for 21st century project delivery.
43 *International Journal of Project Management*, 29(4), 383-395.
44
45 Lunenburg, F. C. (2011). Leadership versus Management: A Key Distinction - At Least in Theory.
46 *International Journal of Management, Business and Administration*, 14(1), 1-4.
47
48 Malach-pines, A., & Dvir, D. (2008). Project manager-project (PM-P) fit and project success.
49 *International Journal of Operations and Production Management*, 29(3), 268-291.
50
51
52
53
54
55
56
57
58
59
60

- 1
2
3 Medina, R., & Medina, A. (2014). The project manager and the organisation's long-term
4 competence goal. *International Journal of Project Management*, 32(8), 1459-1470.
5
6 Montequin, V., Nieto, A., Ortega, F., & Villanueva, J. (2015). Managerial style profiles of
7 successful project managers: a survey. *Procedia Computer Science*, 64(1), 55-62.
8
9 Moore, D. R., Cheng, M.-I., & Dainty, A. R. (2002). Competence, competency and competencies:
10 performance assessment in organizations. *Work Study*, 51(6), 314-319.
11
12 Morgeson, F. P., DeRue, D. S., & Karam, E. P. (2010). Leadership in Teams: A Functional
13 Approach to Understanding Leadership Structures and Processes. *Journal of Management*,
14 36(1), 5-39.
15
16
17 Moynihan, D. P., Pandey, S. K., & Wright, B. E. (2012). Setting the Table: How Transformational
18 Leadership Fosters Performance Information Use. *Journal of Public Administration*
19 *Research and Theory*, 22(1), 143-164.
20
21 Muller, R., Geraldi, J., & Turner, R. J. (2012). Relationships Between Leadership and Success in
22 Different Types of Project Complexities. *IEEE Transactions on Engineering Management*,
23 59(1), 77-90.
24
25
26 Müller, R., & Turner, R. J. (2007a). Influence of project managers on project success criteria and
27 project success by type of project. *European Management Journal*, 25(4), 298-309.
28
29 Müller, R., & Turner, R. J. (2007b). Matching the project manager's leadership style to project
30 type. *International Journal of Project Management*, 25(1), 21-32. Müller, R., & Turner, R.
31 J. (2010a). Attitudes and leadership competences for project success. *Baltic Journal of*
32 *Management*, 5(3), 307-329.
33
34 Müller, R., & Turner, R. J. (2010b). Leadership competency profiles of successful project
35 managers. *International Journal of Project Management*, 28(5), 437-448.
36
37
38 Nahod, M. M., Vukomanovi, M., & Radujkovi, M. (2013). The Impact of ICB 3.0 Competences
39 on Project Management Success. *Procedia - Social and Behavioral Sciences*, 74(1), 105-
40 115.
41
42 Nicholas, J. M., & Steyn, H. (2017). *Project management for engineering, business and*
43 *technology*: Taylor & Francis.
44
45 Nixon, P., Harrington, M., & Parker, D. (2012). Leadership performance is significant to project
46 success or failure: a critical analysis. *International Journal of Productivity and*
47 *Performance Management*, 61(2), 204-216.
48
49
50 Obradovica, V., Jovanovicb, P., Petrovica, D., Mihica, M., & Mitrovica, Z. (2013). Project
51 Managers' Emotional Intelligence - A Ticket to Success *Procedia - Social and Behavioral*
52 *Sciences*, 74(1), 301-311.
53
54
55
56
57
58
59
60

- 1
2
3 Padalkar, M., & Gopinath, S. (2016). Six decades of project management research: Thematic
4 trends and future opportunities. *International Journal of Project Management*, 34(7),
5 1305-1321.
6
7 Parris, D. L., & Peachey, J. W. (2013). A systematic literature review of servant leadership theory
8 in organizational contexts. *Journal of Business Ethics*, 113(3), 377-393.
9
10 Patanakul, P. (2014). Managing large-scale IS/IT projects in the public sector: Problems and
11 causes leading to poor performance. *Journal of High Technology Management Research*,
12 25(1), 21-35.
13
14 Philbin, S. P. (2008). Managing complex technology projects. *Research-Technology Management*,
15 51(2), 32-39.
16
17 Philbin, S. P., & Kennedy, D. A. (2014). Diagnostic framework and health check tool for
18 engineering and technology projects. *Journal of Industrial Engineering and Management*,
19 7(5), 1145-1166.
20
21 Philbin, S. P. (2017). Investigating the Scope for Agile Project Management to Be Adopted by
22 Higher Education Institutions. In *Software Project Management for Distributed Computing*
23 (pp. 345-366). Springer International Publishing.
24
25 Prabhakar, G. P. (2005). An Empirical Study Reflecting the Importance of Transformational
26 Leadership on Project Success Across Twenty-Eight Nations. *Project Management*
27 *Journal*, 36(4), 53-60.
28
29 Prabhakar, G. P. (2008). What is Project Success: A Literature Review. *International Journal of*
30 *Bussiness and Management*, 3(9), 3-10.
31
32 Qureshi, T. M., Warraich, A. S., & Hijazi, S. T. (2009). Significance of project management
33 performance assessment (PMPA) model. *International Journal of Project Management*,
34 27(4), 378-388.
35
36 Shao, J., Müller, R., & Turner, J. R. (2012). Measuring Program Success. *Project Management*
37 *Journal*, 43(1), 37-49.
38
39 Shenhar, A. J., & Dvir, D. (2007). *Reinventing project management: The diamond approach to*
40 *successful growth and innovation*. Boston, MA: Harvard Business School Press.
41
42 Shibru, B., & Darshan, G. M. (2011). Transformational Leadership and its Relationship with
43 Subordinate Satisfaction with the Leader (The case of Leather Industry in Ethiopia).
44 *Interdisciplinay Journal of Contemporary Research in Business*, 3(5), 686-697.
45
46 Shokrzadesh, S., Sabbaghian, Z., Pardakhtchi, M. H., & Abolghasemi, M. (2012). Knowledge-
47 oriented roles of managers and its relationship to knowledge management process. *African*
48 *Journal of Business Management*, 6(4), 1667-1673.
49
50
51
52
53
54
55
56
57
58
59
60

- 1
2
3 Tabassi, A. A., Roufechaei, K. M., Ramli, M., Bakar, A. H. A., Ismail, R., & Pakir, A. H. K.
4 (2016). Leadership competences of sustainable construction project managers. *Journal of*
5 *Cleaner Production*, 124, 339-349.
- 6
7 Thorpe, R., Holt, R., Macpherson, A., & Pittaway, L. (2005). Using knowledge within small and
8 medium-sized firms: A systematic review of the evidence. *International Journal of*
9 *Management Reviews*, 7(4), 257-281.
- 10
11
12 Toor, S. R., & Ofori, G. (2006). An antecedental model of leadership development. Paper
13 presented at the *Joint International Symposium of CIB Working Commissions*, Rome, Italy.
- 14
15 Tranfield, D., Denyer, D., & Smart, P. (2003). Towards a methodology for developing
16 evidence-informed management knowledge by means of systematic review. *British*
17 *Journal of Management*, 14(3), 207-222.
- 18
19
20 Tseng, S.-M. (2017). Investigating the moderating effects of organizational culture and leadership
21 style on IT adoption and knowledge sharing intention. *Journal of Enterprise Information*
22 *Management*, 30(4), 583-604.
- 23
24 Turner, J. R., & Müller, R. (2005). The Project Manager's Leadership Style as a Success Factor
25 on Projects: A Literature Review. *Project Management Journal*, 36(2), 49-61.
- 26
27 Walker, A., & Kwong Wing, C. (1999). The relationship between construction project
28 management theory and transaction cost economics. *Engineering, Construction and*
29 *Architectural Management*, 6(2), 166-176.
- 30
31
32 Weed, M. (2005). " *Meta Interpretation*": A Method for the Interpretive Synthesis of Qualitative
33 *Research*. Paper presented at the Forum Qualitative Sozialforschung/Forum: Qualitative
34 Social Research. 6(1), 1-17.
- 35
36
37 Wilkinson, S. (2001). An analysis of the problems faced by project management companies
38 managing construction projects. *Engineering, Construction and Architectural*
39 *Management*, 8(3), 160-170.
- 40
41 Woodruffe, C. (1991). Competent by any other name. *Personnel Management*, 23(9), 30-33.
- 42
43 Yang, L.-R., Wu, K.-S., & Huang, C.-F. (2013). Validation of a Model Measuring the Effect of a
44 Project Manager's Leadership Style on Project Performance. *KSCE Journal of Civil*
45 *Engineering*, 17(2), 271-280.
- 46
47 Ying, C. Y., Ken, S., & Ting, T. (2012). Emotional Intelligence and Transformational Leadership
48 Outcomes : Insights from a Malaysian Perspective. *World Journal of Social Sciences*, 2(2),
49 151-160.
- 50
51
52 Zhang, L., & Cheng, J. (2015). Effect of knowledge leadership on knowledge sharing in
53 engineering project design teams: the role of social capital. *Project Management Journal*,
54 46(5), 111-124.
- 55
56
57
58
59
60

1
2
3 Zuo, J., Zhao, X., Nguyen, Q. B. M., Ma, T., & Gao, S. (2018). Soft skills of construction project
4 management professionals and project success factors. *Engineering, Construction and*
5 *Architectural Management*, 25(3), 425-442.
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Appendix A: Further details on the top-rated leadership competencies

Communication:

Clearly communicate vision and instructions among project team members and establish formal communication channels among stakeholders.

Developing/ growth:

Develop competencies and invest efforts in coaching for growth of others to contribute effectively in projects.

Achieving:

Focus to achieve project objectives and take decisions based on core issues as well as mitigate significant risks.

Critical analysis and judgment:

Critically probe the project issues to identify advantages, disadvantages, and shortcomings as well as make sound judgments and decision based on realistic assumptions.

Empowering:

Encourage project team members and give autonomy to take challenging tasks as well as solve problems and produce innovative ideas.

Managing resources:

Transform project objectives and long-term goals into action plans through forward planning and organizing resources, and regular monitoring of team members' work through providing constructive and honest feedback.

Organizational/ Strategic perspective:

Consider and analyze project issues from a broader perspective, and identify opportunities and threats to balance short-term and long-terms implications of the project.

Conscientiousness:

Demonstrate commitment to pursue an ethical solution to a challenging issue and encourage the project team to support the chosen direction.

Engaging:

Engage team members to achieve project objectives through enthusiastic and lively interaction.

Influence:

Encourage project team members to provide their views based on logic and their position through recognizing the need to listen and giving a rational premise for change.

Motivation:

Motivate project team members through energy and drive to attain project objectives with the ability to face rejection or questioning.

Sensitivity/ Agreeableness:

Aware of needs and perceptions of project team to arrive at decisions and suggest balanced solutions to challenges and problems.

Vision and imagination:

Establish sound priorities for future work with a clear and innovative vision of the future direction of the organization to meet project and longer-term business objectives.

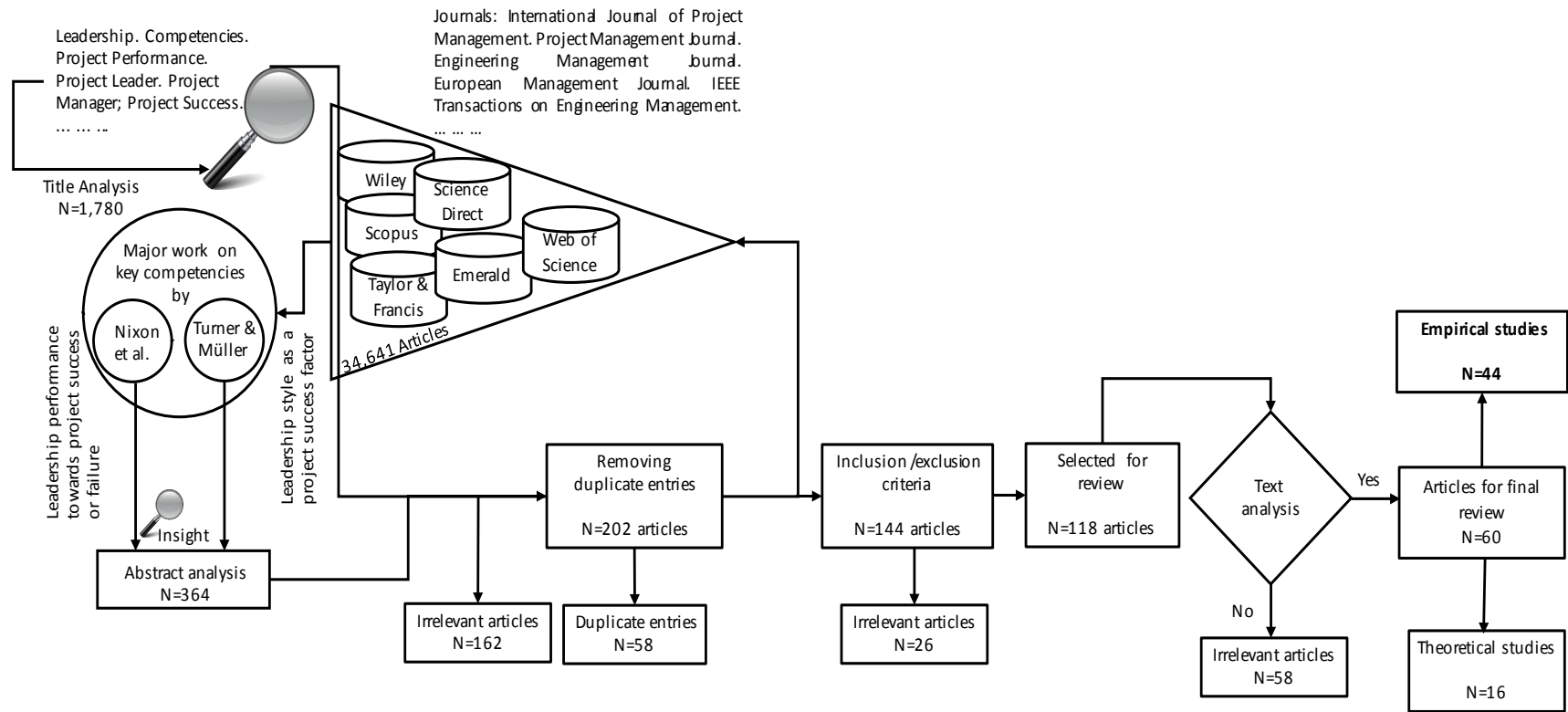


Figure 1. Research design flow chart for systematic literature review (SLR)

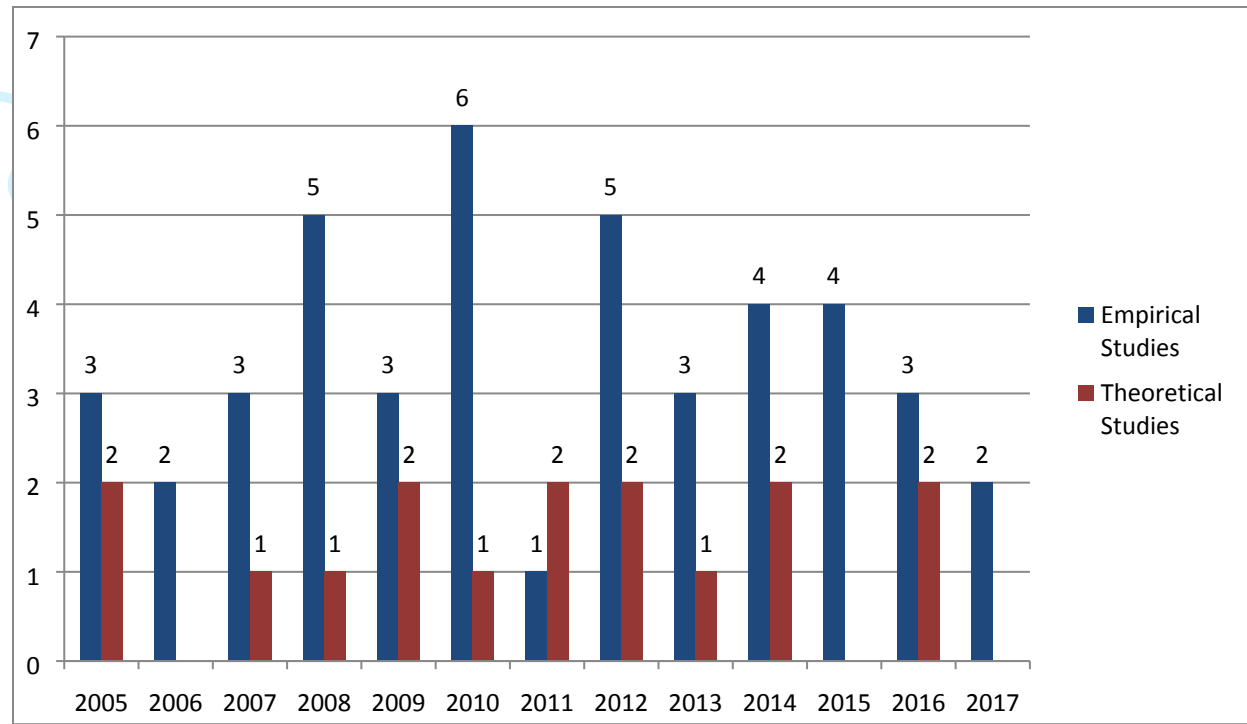


Figure 2. Summary of the year of publication for the articles from the SLR.

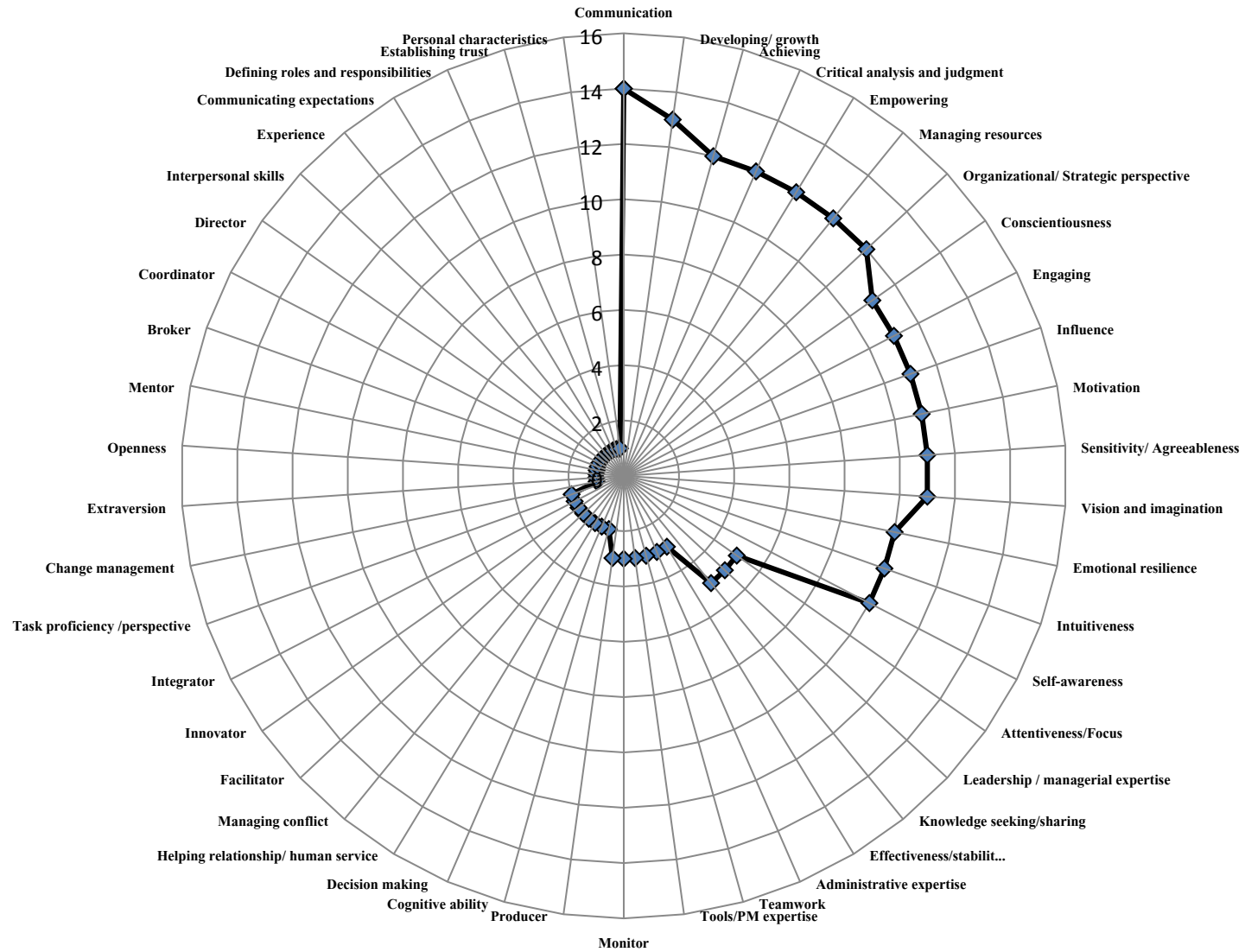


Figure 3. Popularity of project manager's leadership competencies based on SLR.

RELATIONSHIP-ORIENTED	INNOVATION-ORIENTED	TASK-ORIENTED
<p>Intellectual Competencies</p> <ul style="list-style-type: none"> • Conscientiousness • Emotional resilience • Influence • Intuitiveness • Motivation • Self-awareness • Sensitivity 	<p>Intellectual Competencies</p> <ul style="list-style-type: none"> • Attentiveness/focus • Critical analysis and judgment • Innovator • Knowledge seeking/sharing • Strategic perspective and cognitive ability • Vision and imagination 	<p>Managerial Competencies</p> <ul style="list-style-type: none"> • Achieving • Decision making • Defining roles and responsibilities • Developing and empowering • Engaging communication • Integrator • Leadership/managerial expertise • PM tools expertise • Resource management • Task proficiency/perspective • Teamwork
<p>Intellectual Competencies</p> <ul style="list-style-type: none"> • Broker • Communicating • Establishing trust • Expectations • Experience • Interpersonal skills • Managing conflict • Mentor • Openness • Personal characteristics • Change management 	<p>Clusters of Project Manager's Leadership Competencies</p>	<p>Administrative Competencies</p> <ul style="list-style-type: none"> • Administrative expertise • Coordinator • Director • Effectiveness/stability • Extraversion • Facilitator • Helping/human service • Monitor • Produce

Figure 4. Clusters of project manager's leadership competencies.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

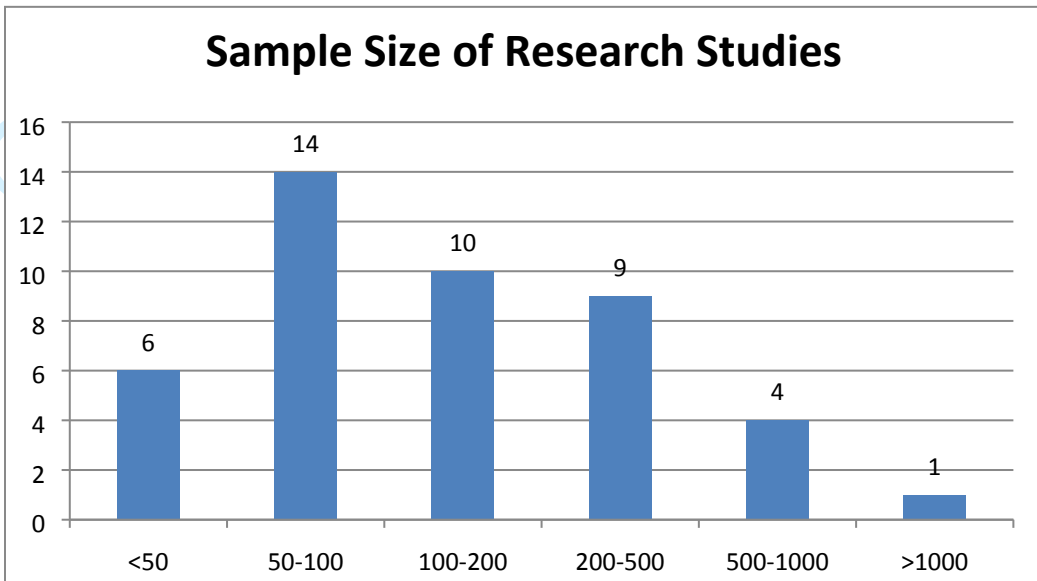


Figure 5. Graphical depiction of sample size of SLR studies.

Table 1. Number of publications per keyword searched from bibliographic databases

Databases / Keyword	Publications							
	Leadership competencies	Leadership styles	Project leadership	Project manager leadership	Leadership competencies and styles	Project manager's leadership competency	Project manager's leadership style	Leadership and project success
Cambridge Journals	31	24	100	23	1	1	3	9
EBSCOHOST	815	5,343	2,389	332	307	27	138	292
Emerald	152	191	302	14	5	2	1	491
IEEE	2,561	209	611	82	4	2	11	106
JSTOR	11	58	62	2	0	4	10	9
SAGE Journals	21	69	5	0	0	0	0	0
Science Direct	146	292	409	56	14	9	10	74
Scopus	1,503	2,588	4,751	527	89	39	60	773
Taylor and Francis	174	382	205	89	11	4	10	89
Web of Science	925	1,859	2,656	321	58	35	39	483
Wiley Online	207	324	437	60	16	5	5	77

Table 2. Summary of systematic literature review publications

Database/ Publisher	Journal	No of Articles	Literature Review
Science Direct	International Journal of Project Management	11	Ahadzie et al. (2014); Andersen (2016); Dolfi and Andrews (2007); Eweje, Turner, and Müller (2012); Kaulio (2008); Lloyd-Walker and Walker (2011); Loufrani-Fedida and Missonier (2016); Medina and Medina (2014); Müller and Turner (2007); Müller and Turner (2010); Qureshi, Warraich, and Hijazi (2009);
Wiley Online	Project Management Journal	8	Anantatmula and Thomas (2010); Clarke (2010); Geoghegan and Dulewicz (2008); Jugdev and Müller (2005); Prabhakar (2005); Shao, Müller, and Turner (2012); Turner and Müller (2005); Zhang and Cheng (2015)
Science Direct	Leadership Quarterly	2	Avolio, Reichard, Hannah, Walumbwa, and Chan (2009); Battilana, Gilmartin, Sengul, Pache, and Alexander (2010)
Taylor & Francis Scopus	Engineering Management Journal	2	Ahmed and Anantatmula (2017); Anantatmula (2010)
Science Direct	International Journal of Managing Projects in Business	2	Christenson and Walker (2008); Ika and Saint- Macary (2012)
Science Direct	Procedia - Social and Behavioral Sciences	2	Nahod, Vukomanovi, and Radujkovi (2013); Obradovica, Jovanovicb, Petrovica, Mihica, and Mitrovica (2013)
ProQuest	African Journal of Business Management	2	Kuen, Zailani, and Fernando (2009); Shokrzadesh, Sabbaghian, Pardakhtchi, and Abolghasemi (2012)
Scopus	International Journal of Information Technology Project Management	1	Ahmed and Mohamad (2016)
Scopus	International Journal of Productivity and Performance Management	1	Nixon, Harrington, and Parker (2012)
Scopus	The Journal of Modern Project Management	1	Ahmed and Mohamad (2014)
Scopus	Baltic Journal of Management	1	Andersen, Birchall, Jessen, and Money (2006)
Scopus	European Management Journal	1	Müller and Turner (2007a)
IEEE	IEEE Transactions on Engineering Management	1	Muller, Gerald, and Turner (2012)
ProQuest	Interdisciplinary Journal of Contemporary Research in Business	1	Shibru and Darshan (2011)
Scopus	International Journal of Operations and Production Management	1	Malach-pines and Dvir (2008)
Taylor & Francis	Journal of Construction Engineering and Management	1	Chan and Chan (2005)

Database/ Publisher	Journal	No of Articles	Literature Review
Scopus	Journal of Construction in Developing Countries	1	Limsila and Ogunlana (2008)
JSTOR	Journal of Economic Development, Management, IT, Finance & Marketing	1	Galvin, Gibbs, Sullivan, and Williams (2014)
Scopus	Journal of Managerial Psychology	1	Dulewicz and Higgs (2005)
ProQuest	Journal of Public Administration Research and Theory	1	Moynihan, Pandey, and Wright (2012)
Springer	KSCE Journal of Civil Engineering	1	Yang, Wu, and Huang (2013)
Scopus	Management Research News	1	Curran, Niedergassel, Picker, and Leker (2009)
JSTOR	World Journal of Social Sciences	1	Ying, Ken, and Ting (2012)
Science Direct	Journal of Engineering and Technology Management	1	Aronson et al. (2006)
ProQuest	Journal of Empirical Studies	1	Fung (2014)
Scopus	Journal of Management in Engineering	1	Larsson et al. (2015)
Science Direct	Procedia Computer Science	1	Montequin et al. (2015)
Scopus	Journal of Applied Environmental and Biological Sciences	1	Khanaposhtayi and Abyane (2015)
Science Direct	Journal of Cleaner Production	1	Tabassi et al. (2016)
Emerald	Journal of Enterprise Information Management	1	Tseng (2017)
JSTOR	Society and Economy	1	Blaskovics (2016)
EBSCOH OST	Asian Journal of Management Research	1	Bakar, Razak, Abdullah, and Awang (2009)
EBSCOH OST	Research Journal of Recent Sciences	1	Ahmed and Mohamad (2014)
Emerald	International Journal of Leadership in Public Services	1	Spencer (2007)
JSTOR	Journal of Management	1	Morgeson, DeRue, and Karam (2010)
ProQuest	International Journal of Business and Management	1	Prabhakar (2008)
Web of Science	International Journal of Management, Business and Administration	1	Lunenburg (2011)
Web of Science	International Journal of Scientific and Engineering Research	1	Ahmed et al. (2013)
	Total	60	

Table 3. Summary of literature review on project manager's leadership competencies

Project Manager's Leadership Competencies	Literature References
Communication	Dulewicz and Higgs (2005); Brill, Bishop, and Walker (2006); Müller and Turner (2007b); Geoghegan and Dulewicz (2008); Müller and Turner (2010); Gilley, Gilley, McConnell, and Veliquette (2010); Müller and Turner (2010); Clarke (2010); Müller, Geraldi, and Turner (2012); Galvin, Gibbs, Sullivan, and Williams (2014); Ahmed and bin Mohamad (2014); Khanaposhtayi and Abyane (2015); Ahmed and Mohamad (2016); Ahmed and Anantatmula (2017)
Developing/ growth	Dulewicz and Higgs (2005); Müller and Turner (2007b); Geoghegan and Dulewicz (2008); R. Müller and J. R. Turner (2010); Gilley, Gilley, McConnell, and Veliquette (2010); Müller and Turner (2010); Müller, Geraldi, and Turner (2012); Galvin, Gibbs, Sullivan, and Williams (2014); Ahmed and bin Mohamad (2014); Khanaposhtayi and Abyane (2015); Larsson et al. (2015); Ahmed and Mohamad (2016); Tabassi et al. (2016)
Achieving	Dulewicz and Higgs (2005); Müller and Turner (2007b); Limsila and Ogunlana (2008); Geoghegan and Dulewicz (2008); Müller and Turner (2010); Müller and Turner (2010); Müller, Geraldi, and Turner (2012); Galvin, Gibbs, Sullivan, and Williams (2014); Ahmed and bin Mohamad (2014); Khanaposhtayi and Abyane (2015); Ahmed and Mohamad (2016); Tabassi et al. (2016)
Critical analysis and judgment	Dulewicz and Higgs (2005); Brill, Bishop, and Walker (2006); Müller and Turner (2007b); Geoghegan and Dulewicz (2008); Müller and Turner (2010); Müller and Turner (2010); Müller, Geraldi, and Turner (2012); Galvin, Gibbs, Sullivan, and Williams (2014); Ahmed and bin Mohamad (2014); Khanaposhtayi and Abyane (2015); Ahmed and Mohamad (2016); Tabassi et al. (2016)
Empowering	Dulewicz and Higgs (2005); Müller and Turner (2007b); Geoghegan and Dulewicz (2008); Müller and Turner (2010); Gilley, Gilley, McConnell, and Veliquette (2010); Müller and Turner (2010); Müller, Geraldi, and Turner (2012); Galvin, Gibbs, Sullivan, and Williams (2014); Ahmed and bin Mohamad (2014); Khanaposhtayi and Abyane (2015); Ahmed and Mohamad (2016); Tabassi et al. (2016);
Managing resources	Dulewicz and Higgs (2005); Müller and Turner (2007b); Geoghegan and Dulewicz (2008); Müller and Turner (2010); Müller and Turner (2010); Müller, Geraldi, and Turner (2012); Gentry and Sparks (2012); Galvin, Gibbs, Sullivan, and Williams (2014); Ahmed and bin Mohamad (2014); Khanaposhtayi and Abyane (2015); Ahmed and Mohamad (2016); Tabassi et al. (2016)
Organizational/ Strategic perspective	Dulewicz and Higgs (2005); Müller and Turner (2007b); Geoghegan and Dulewicz (2008); Müller and Turner (2010); Müller and Turner (2010); Müller, Geraldi, and Turner (2012); Galvin, Gibbs, Sullivan, and Williams (2014); Ahmed and bin Mohamad (2014); Khanaposhtayi and Abyane (2015); Ahmed

**Project Manager's Leadership
Competencies**

Literature References

	and Mohamad (2016); Tabassi et al. (2016); Andersen (2016)
Conscientiousness	Dulewicz and Higgs (2005); Aronson et al. (2006); Müller and Turner (2007b); Geoghegan and Dulewicz (2008); Müller and Turner (2010); Müller and Turner (2010); Müller, Gerald, and Turner (2012); Galvin, Gibbs, Sullivan, and Williams (2014); Ahmed and bin Mohamad (2014); Khanaposhtayi and Abyane (2015); Ahmed and Mohamad (2016)
Engaging	Dulewicz and Higgs (2005); Müller and Turner (2007b); Geoghegan and Dulewicz (2008); Müller and Turner (2010); Müller and Turner (2010); Müller, Gerald, and Turner (2012); Galvin, Gibbs, Sullivan, and Williams (2014); Ahmed and bin Mohamad (2014); Khanaposhtayi and Abyane (2015); Ahmed and Mohamad (2016); Tabassi et al. (2016);
Influence	Dulewicz and Higgs (2005); Müller and Turner (2007b); Limsila and Ogunlana (2008); Geoghegan and Dulewicz (2008); Müller and Turner (2010); Müller and Turner (2010); Müller, Gerald, and Turner (2012); Galvin, Gibbs, Sullivan, and Williams (2014); Ahmed and bin Mohamad (2014); Khanaposhtayi and Abyane (2015); Ahmed and Mohamad (2016)
Motivation	Dulewicz and Higgs (2005); Müller and Turner (2007b); Geoghegan and Dulewicz (2008); Müller and Turner (2010); Gilley, Gilley, McConnell, and Veliquette (2010); Müller and Turner (2010); Müller, Gerald, and Turner (2012); Galvin, Gibbs, Sullivan, and Williams (2014); Ahmed and bin Mohamad (2014); Khanaposhtayi and Abyane (2015); Ahmed and Mohamad (2016)
Sensitivity/ Agreeableness	Dulewicz and Higgs (2005); Aronson et al. (2006); Müller and Turner (2007b); Geoghegan and Dulewicz (2008); Müller and Turner (2010); Müller and Turner (2010); Müller, Gerald, and Turner (2012); Galvin, Gibbs, Sullivan, and Williams (2014); Ahmed and bin Mohamad (2014); Khanaposhtayi and Abyane (2015); Ahmed and Mohamad (2016)
Vision and imagination	Dulewicz and Higgs (2005); Müller and Turner (2007b); Geoghegan and Dulewicz (2008); Müller and Turner (2010); Müller and Turner (2010); Müller, Gerald, and Turner (2012); Galvin, Gibbs, Sullivan, and Williams (2014); Ahmed and bin Mohamad (2014); Khanaposhtayi and Abyane (2015); Ahmed and Mohamad (2016); Tabassi et al. (2016)
Emotional resilience	Dulewicz and Higgs (2005); Müller and Turner (2007b); Geoghegan and Dulewicz (2008); Müller and Turner (2010); Müller and Turner (2010); Müller, Gerald, and Turner (2012); Galvin, Gibbs, Sullivan, and Williams (2014); Ahmed and bin Mohamad (2014); Khanaposhtayi and Abyane (2015); Ahmed and Mohamad (2016);
Intuitiveness	Dulewicz and Higgs (2005); Müller and Turner (2007b); Geoghegan and Dulewicz (2008); Müller and Turner (2010); Müller and Turner (2010); Müller, Gerald, and Turner (2012); Galvin, Gibbs, Sullivan, and Williams (2014);

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

**Project Manager's Leadership
Competencies**
Literature References

	Ahmed and bin Mohamad (2014); Khanaposhtayi and Abyane (2015); Ahmed and Mohamad (2016)
Self-awareness	Dulewicz and Higgs (2005); Müller and Turner (2007b); Geoghegan and Dulewicz (2008); Müller and Turner (2010); Müller and Turner (2010); Müller, Geraldi, and Turner (2012); Galvin, Gibbs, Sullivan, and Williams (2014); Ahmed and bin Mohamad (2014); Khanaposhtayi and Abyane (2015); Ahmed and Mohamad (2016);
Attentiveness/Focus	Brill, Bishop, and Walker (2006); Clarke (2010); Montequin et al. (2015); Andersen (2016); Tseng (2017)
Leadership / managerial expertise	Brill, Bishop, and Walker (2006); Gilley, Gilley, McConnell, and Veliquette (2010); Andersen (2016); Ahmed and Anantatmula (2017); Tseng (2017)
Knowledge seeking/sharing	Brill, Bishop, and Walker (2006); Ahadzie et al. (2014); Montequin et al. (2015); Zhang and Cheng (2015); Tseng (2017)
Effectiveness/stability	Aronson et al. (2006); Limsila and Ogunlana (2008); Gentry and Sparks (2012)
Administrative expertise	Brill, Bishop, and Walker (2006); Larsson et al. (2015); Andersen (2016)
Teamwork	Gilley, Gilley, McConnell, and Veliquette (2010); Clarke (2010); Gentry and Sparks (2012);
Tools/PM expertise	Brill, Bishop, and Walker (2006); Blaskovics (2016); Ahmed and Anantatmula (2017)
Monitor	Fung (2014); Andersen (2016); Tseng (2017)
Producer	Fung (2014); Larsson et al. (2015); Andersen (2016)
Cognitive ability	Limsila and Ogunlana (2008); Ahadzie et al. (2014);
Decision making	Limsila and Ogunlana (2008); Montequin et al. (2015)
Helping relationship/ human service	Limsila and Ogunlana (2008); Montequin et al. (2015);
Managing conflict	Brill, Bishop, and Walker (2006); Clarke (2010)
Facilitator	Fung (2014); Zhang and Cheng (2015);
Innovator	Fung (2014); Zhang and Cheng (2015)
Integrator	Zhang and Cheng (2015); Larsson et al. (2015)
Task proficiency /perspective	Ahadzie et al. (2014); Andersen (2016)
Change management	Gentry and Sparks (2012)
Extraversion	Aronson et al. (2006)

**Project Manager's Leadership
Competencies****Literature References**

Openness	Aronson et al. (2006)
Mentor	Fung (2014)
Broker	Fung (2014)
Coordinator	Fung (2014)
Director	Fung (2014)
Interpersonal skills	Ahadzie et al. (2014)
Experience	Ahadzie et al. (2014)
Communicating expectations	Ahmed and Anantatmula (2017)
Defining roles and responsibilities	Ahmed and Anantatmula (2017)
Establishing trust	Ahmed and Anantatmula (2017)
Personal characteristics	Blaskovics (2016)

Table 4. Summary of research methods of systematic literature review studies

Sr. No.	Author/ Year	Methods / Techniques	Measurement Scale	Country/ Region	Respondent	Sample Size
1.	Ahmed and Anantatmula (2017)	Survey questionnaire, correlation, regression, structural equation modeling	5-point Likert	Pakistan	Project managers of public sector projects from Pakistan.	289
2.	Tseng (2017)	Survey questionnaire, correlation, hierarchical regression	7-point Likert	Taiwan	Managers from large Taiwanese corporations.	125
3.	Andersen (2016)	Survey questionnaire, descriptive, factor analysis	7-point Likert	Norway	Project managers from government and private industry in Norway.	180
4.	Blaskovics (2016)	Semi-structure 3-step interviews	Interviews	Hungary	Project managers of Hungarian companies from the ICT sector.	25
5.	Tabassi et al. (2016)	Survey questionnaire, descriptive, factor analysis	5-point Likert	Malaysia	Project managers of sustainable building projects from three large cities in Malaysia.	70
6.	Khanaposhtayi and Abyane (2015)	Survey questionnaire, Fuzzy analytic analysis process	5-point Likert	Iran	Lecturers and project management experts.	15
7.	Larsson et al. (2015)	Survey questionnaire, descriptive, correlation, hierarchical regression	5-point Likert	Sweden	Project managers of largest public infrastructure clients in Sweden.	162
8.	Montequin et al. (2015)	Survey questionnaire, descriptive, frequency, correlation	5-point Likert	Australia, Europe, New Zealand, UK, USA	Project managers from different industries.	78
9.	Zhang and Cheng (2015)	Survey questionnaire, descriptive, correlation, regression	5-point Likert	China	Designers engaged in construction and engineering design projects in China.	178

Sr. No.	Author/ Year	Methods / Techniques	Measurement Scale	Country/ Region	Respondent	Sample Size
10.	Ahadzie et al. (2014)	Structured quantitative survey, descriptive, correlation, multiple regression	5-point Likert	Ghana	Project managers of real estate companies from Ghana.	61
11.	Fung (2014)	Survey questionnaire, descriptive, correlation, path analysis	7-point Likert	Malaysia	Project managers from the PMI Malaysia Chapter.	201
12.	Galvin et al. (2014)	Survey questionnaire, descriptive, correlation	5-point Likert	USA	Project managers from different industries in USA.	38
13.	Medina and Medina (2014)	Web quantitative survey, descriptive, correlation, regression	5-point Likert	Sweden	Project managers and project team members from industrial companies in Sweden.	63
14.	Nahod et al. (2013)	Survey questionnaire, descriptive, correlation	6-point Likert	Croatia	Project management professionals from the construction industry in Croatia.	472
15.	Obradovica et al. (2013)	Survey questionnaire, descriptive, correlation, regression	5-point Likert	Serbia	Project managers from top 10 companies in Serbia.	75
16.	Yang et al. (2013)	Survey questionnaire, factor analysis, structural equation modeling	5-point Likert	Taiwan	Project directors, project planners, and project superintendents from the construction industry in Taiwan.	213
17.	Eweje et al. (2012)	Survey questionnaire, Descriptive, correlation, regression	5-point Likert	Global survey	Project managers.	69
18.	Moynihan et al. (2012)	Survey , Descriptive, correlation, structural equation modeling	5-point Likert	USA	Senior managers.	1538

Sr. No.	Author/ Year	Methods / Techniques	Measurement Scale	Country/ Region	Respondent	Sample Size
19.	Müller et al. (2012)	Survey, descriptive, correlation, hierarchical regression	5-point Likert	Sweden and UK	Project managers from PMI and IPMA.	119
20.	Shao et al. (2012)	Survey, descriptive, correlation, regression	5-point Likert	Multiple organizations	Program managers from PM associations.	172
21.	Shokrzadesh et al. (2012)	Survey, descriptive, correlation, regression	6-point Likert	Iran	Atomic Energy Organization of Iran.	328
22.	Ying et al. (2012)	Survey, descriptive, correlation	5-point Likert	Malaysia	Lecturers in higher education in Malaysia.	93
23.	Shibru and Darshan (2011)	Survey, descriptive, correlation	5-point Likert	India	Workers at Ethiopian leather companies.	145
24.	Clarke (2010)	Survey, correlation, regression	5-point Likert	UK	Project managers from PMI Chapter in the UK.	67
25.	Anantatmula (2010)	Structured questionnaire & interviews Interpretive structural modeling	Inter-views	USA	Project managers, senior managers, consultants, and other managers.	69
26.	Anantatmula and Thomas (2010)	Survey questionnaire, interpretive structural modeling, descriptive, regression	5-point Likert	Global projects	Project managers having a project management qualification.	76
27.	Battilana et al. (2010)	Survey questionnaire, descriptive, correlation, regression	5-point Likert	UK	Middle and top-level managers.	89
28.	Müller and Turner (2010)	Survey questionnaire, descriptive, factor analysis, regression	5-point Likert	Australia, Europe, New Zealand & USA	Members of PMI, APMA, APM and ASAPM organizations.	400
29.	Curran et al. (2009)	Questionnaire, descriptive, regression	7-point Likert	Europe & USA	Lab manager to chief executive officer (CEO), from the chemical, pharmaceutical and biotechnology industries.	84

Sr. No.	Author/ Year	Methods / Techniques	Measurement Scale	Country/ Region	Respondent	Sample Size
30.	Kuen et al. (2009)	factor analysis, correlation, , hierarchal regression	5-point Likert	Malaysia	Managers from Manufacturing organizations.	79
31.	Qureshi et al. (2009)	Survey questionnaire, descriptive, correlation	5-point Likert	Pakistan	Managers from 28 different organizations.	50
32.	Christenson and Walker (2008)	Interviews, qualitative research design, case studies		Canada & Australia	Participants of workshops from public service organizations.	23
33.	Geoghegan and Dulewicz (2008)	Survey, descriptive, regression	5-point Likert	UK	Project managers and project sponsors.	52
34.	Kaulio (2008)	Questionnaire, frequency of occurrence, qualitative analysis		Sweden	Project managers.	48
35.	Limsila and Ogunlana (2008)	Survey Descriptive, correlation	5-point Likert	Thailand	Project managers and other workers.	156
36.	Malach-pines and Dvir (2008)	Questionnaire, descriptive, correlation	5-point Likert	Israel	Project managers who managed projects in Israel during 2002-2007.	289
37.	Dolfi and Andrews (2007)	Survey questionnaire, Descriptive, correlation	7-Point Likert	North America	Project managers.	858
38.	Müller and Turner (2007)	Survey questionnaire Descriptive, Correlation, ANOVA with post-hoc Scheffe test	5-point Likert	Australia, Europe, New Zealand, North America	Professionals and members of PMI, IPMA, AMP and personal contacts.	959
39.	Müller and Turner (2007)	Interviews, survey questionnaire descriptive, correlation, multivariate regression	5-point Likert	Project management associations (PMI, IPMA, APA and ASAPM)	Project workers from USA, Australia and Europe from different industries.	400
40.	Andersen et al. (2006)	Survey questionnaire KMO, PCA, correlation, regression	5-point Likert	UK, France, Norway, China	Project managers, sponsors, project champions, and clients.	529

Sr. No.	Author/ Year	Methods / Techniques	Measurement Scale	Country/ Region	Respondent	Sample Size
41.	Aronson et al. (2006)	Survey questionnaire descriptive, correlation, model fit indices	5-point Likert	USA	Product, senior engineering, technical and marketing managers	143
42.	Chan and Chan (2005)	Survey questionnaire descriptive, correlation, regression	5-point Likert	Australia, China, UK, Singapore	Architects, structural engineers, and surveyors	510
43.	Prabhakar (2005)	Survey questionnaire descriptive, correlation, regression	5-point Likert	29 Nations	Project managers from 28 countries.	153
44.	Dulewicz and Higgs (2005)	Survey questionnaire descriptive, correlation, regression	5-point Likert	UK, Europe	Managers and officers.	222

Table 5. Summary of categorization criteria and priority levels matrix

Criteria for Categorization of Priority Levels			
Round of Frequencies Mean	<i>1st round</i>	<i>2nd round</i>	<i>3rd round</i>
Priority Criteria	>Mean=High	>Mean=Moderate	=1 and <Mean= Low
Sample (N)	N=46	N=30	N=13
Mean (M)	M=5	M=2	M<2
Prioritized Competencies (n)	n=16	n=17	n=13
<i>Priority Levels</i>	<i>High Level</i>	<i>Moderate Level</i>	<i>Low Level</i>
High	<ul style="list-style-type: none"> ▪ Achieving ▪ Communication ▪ Conscientiousness ▪ Critical analysis and judgment ▪ Developing/ growth ▪ Emotional resilience ▪ Empowering ▪ Engaging ▪ Influence ▪ Intuitiveness ▪ Managing resources ▪ Motivation 	<ul style="list-style-type: none"> ▪ Administrative expertise ▪ Attentiveness/Focus ▪ Cognitive ability ▪ Decision making ▪ Effectiveness/stability ▪ Facilitator ▪ Helping/human service ▪ Innovator ▪ Integrator ▪ Knowledge seeking/sharing ▪ Leadership/managerial expertise ▪ Managing conflict ▪ Monitor ▪ PM tools expertise ▪ Producer ▪ Task proficiency /perspective ▪ Teamwork 	<ul style="list-style-type: none"> ▪ Broker ▪ Change management ▪ Communicating expectations ▪ Coordinator ▪ Defining roles and responsibilities ▪ Director ▪ Establishing trust ▪ Experience ▪ Extraversion ▪ Interpersonal skills ▪ Mentor ▪ Openness ▪ Personal characteristics
>Mean=High	<ul style="list-style-type: none"> ▪ Organizational/Strategic perspective ▪ Self-awareness ▪ Sensitivity/ Agreeableness ▪ Vision and imagination 		
=1 and <Mean= Low			
Low			

Manuscript: ID ECAM-05-2019-0276

Paper Title: SYSTEMATIC LITERATURE REVIEW OF PROJECT MANAGER'S LEADERSHIP COMPETENCIES

Journal: Engineering, Construction and Architectural Management

Email from Editor on 23.04.2020

	Comments	Correction/ Revision
Editors Comments		
	The reviewer(s) have recommended publication, but also suggest some minor revisions to your manuscript. Therefore, I invite you to respond to the reviewer(s)' comments and revise your manuscript.	We appreciate the editor and reviewers support and for providing constructive and encouraging feedback and suggestions to improve the manuscript. We have addressed all the comments and suggestions with track changes.
Referees comments		
Referee #1:		
Comments:	This is a nice work and I look forward to seeing the paper in the next format after review.	The authors would like to thank the reviewer for appreciating the research work recommending to the editor for seeing the paper in the next format after review.
1. Originality:	This is a well-crafted study to identify project managers' competencies. The paper provides a nice contribution to the management literature. However, this is a journal grounded in Engineering, Construction, and Architectural Management (ECAM) and the paper needs to address what the contributions to the ECAM community are.	Thanks for acknowledging a well-crafted study and its contribution to the management literature as well as highlighting the need to address its contribution to the ECAM community. The contribution of the study for the ECAM community has been included in the revised manuscript based on empirical studies synthesized in the SLR conducted in engineering, construction, and other projects environment. Moreover, several pertinent references from the <i>Engineering, Construction and Architectural Management</i> journal as part of the Introduction Section strengthen the positioning of the article to the engineering and construction sector. Various other links and insights are also provided to ensure the research study is highly relevant to the ECAM community.
2. Relationship to Literature:	Given that ECAM is a construction-related journal, it is not clear if this field was properly considered in the literature review. Is there anything to be said about project managers in CEM environments. - The paper is already very long but there is value in	The competencies of project managers identified in SLR are from engineering, construction and other projects. In the revised manuscript, the project managers' competencies focus in CEM environments have also been highlighted at relevant places.

	Comments	Correction/ Revision
	describing/explaining the top competencies identified in a table (for example those with 10+ entries within the 44 studies analyzed).	Yes, it is true that SLR is already long but it is also a good suggestion and there is value to describe/explain the top competencies (10+ entries). As suggested, we have described and explained the top competencies (10+ entries) and placed in the Appendix.
3. Methodology:	<p>The method is well-grounded and explained throughout the paper. The figures and tables are very helpful to comprehend the process taken to analyzed the data and the results derived from that.</p> <p>- What part of the papers analyzed are part of the ECAM related literature? And what competencies did they highlight for ECAM practice?</p> <p>- Why papers selected were "published over a 13-year period (2005 to 2017)" why that number of years?</p> <p>- Are the clusters of competencies that could be indicated in the analysis? This could provide more power to the findings if these are clustered versus presented only in a piecemeal fashion.</p>	<p>Thanks for appreciating the well-grounded/explained methods as well as figures and tables used to explain the analyzed data and results in the paper.</p> <p>More than 33 empirical studies (two-third) in SLR (out of 44) are from construction, engineering and project management journals, and more than 25 studies involved respondents working on civil work, construction, engineering or infrastructure projects which uses a mix of competencies and majority falls in high and moderate level competencies.</p> <p>The period 2005-2017 was mentioned due to limited evidence of empirical studies on leadership competencies of project managers in earlier literature, especially, in first literature review study conducted on project manager's leadership styles by Turner & Muller in 2005 and introducing competency school of leadership by Dulwicz & Higgs in 2003 and 2005, after that, a number of studies based on the competency school have explored the leadership competencies. Here, the review comment is valid because the period (13 years) is not adding much value as empirical studies on project manager's leadership competencies have been considered while conducting this SLR. Therefore, the statements regarding 13 years or 2005 to 2017 have been removed from the revised manuscript.</p> <p>This a good idea of clustering competencies to provide power to the findings. We have clustered these competencies in the revised manuscript.</p>

	Comments	Correction/ Revision
	- Which criteria was used to categorize the competencies in high, moderate, or low priority?	The criteria used to categorize the competencies in high, moderate, or low priority was based on means of frequencies, which have been added in the competencies priority table of the revised manuscript.
4. Results:	<p>The findings are properly analyzed according to the method presented.</p> <p>- How do the findings apply specifically to construction engineering and management? Construction is a peculiar type of project-based systems, so what competencies are needed in this specific environment?</p>	The implications and findings with respect to construction, engineering, and management have been updated in the revised manuscript. Competencies needed in specific environment have been clustered and added in the manuscript.
5. Implications for research, practice and/or society:	Which of the competencies might be easier or harder to develop? The authors could speculate, based on the information they have from the study, about that. The study identified the most popular competencies, but are they the most effective? This could be a future research question.	We agree with the referee that the paper is already long. However, which competencies are easier or harder to develop, or most effective in which environment is one of the limitations of this SLR, and this is a recommendation for future research.
6. Quality of Communication:	The paper is very well written and the language used is appropriate to the discussion. The sections of the paper flow well and provide clarity to the method and results presented.	Thanks for appreciating that the paper is well written, and the language is appropriately used for discussion, the flow of paper's sections is well presented, and methods and results are presented with clarity.
Reviewer #2:		
Comments:	The study has the potential to establish a seminal approach for the review of literature in this and similar research areas.	Thanks for the encouraging and motivating comments on conduct of this SLR study.
1. Originality:	The rigour and scope of the methodology is commendable in what is often a rather poorly analysed area of qualitative study.	We thank the referee for commending the rigour and methodology used in this qualitative study.
2. Relationship to Literature:	The review is comprehensive in breath and scope albeit whilst specific criteria are not expanded on in detail, it is reasonable to deduce that a systematic review of the literature has been undertaken to underpin the thematic findings of the study.	We very much appreciate the comments on the comprehensiveness of review in breadth and scope and the findings of the study. It is agreed that we tried to explain specific criteria, keeping in view the significance and length of the paper.
3. Methodology:	See Section 1.	Once again thanks for appreciating and encouraging the authors on methods employed in the study. Yes, it

	Comments	Correction/ Revision
	The paper is in essence a methodological pilot bringing triangulation of mixed methods to bear on a largely subjective and disruptive area of research.	highlights the significance and use of triangulation methods based on findings of the SLR.
4. Results:	<p>Whilst a set of findings are presented and prioritized they are merely reflective of the literature analysed across a period of time which has been subject to significant changes in project management styles and drivers.</p> <p>The strength of the study lies in the methodology and the alignment of diverse sets of results across 1,780 papers.</p>	Yes, findings are based on analysis of SLR which are subject to significant changes in project management environment. To further strengthen the findings, the criteria for prioritizing and clustering of competencies have been included in revised manuscript considering the length of the paper.
5. Implications for research, practice and/or society:	The study presents a commendable exemplar of how to conduct a systematic literature review notably in a subjective and disruptive area of research.	Thanks for the commendable remarks on the conduct of systematic literature review in a subjective and disruptive area of research.
6. Quality of Communication:	Well-written and ably communicated.	Thanks for the acknowledgment of the quality of communication in the paper.

SYSTEMATIC LITERATURE REVIEW OF PROJECT MANAGER'S LEADERSHIP COMPETENCIES

ABSTRACT

Purpose:

Over the last few decades, a large number of research studies have been carried out on project manager's leadership competencies. However, systematic literature reviews are still ~~very~~ scarce in the project management literature. Therefore, the purpose of this article is to conduct a systematic literature review on project manager's leadership competencies based on published empirical research studies ~~published from 2005 to 2017~~.

Methodology:

We employed a systematic literature review (SLR) methodology to synthesize research in a rigorous manner and a total of 1,780 articles were identified in the first step and a final sample of 60 research studies were synthesized.

Findings:

Synthesis of the findings in this SLR on project manager's leadership competencies revealed: a) there is a lack of categorization or ranking of leadership competencies; b) 20 research studies (46%) were conducted with sample sizes of less than 100; c) only a few research studies (<10%) used ~~interviews~~ data for analysis; and d) none of the research studies reported adoption of a triangulation method.

Implications/Limitations:

This study prioritized project manager's leadership competencies as 'high priority', 'moderate priority', and 'low priority'. We ~~recommended~~ a sample size between 200 and 300 to produce sophisticated results and enhance the credibility, ~~generalizeability~~generalizability and validity of future research.

Originality:

Future research studies are suggested to consider systematic literature review combined with face-to-face and group interview in addition to employing triangulation methods. Besides highlighting implications for practitioners, this SLR has advanced the understanding of how to conduct systematic literature reviews in a robust manner.

Keywords: Systematic literature review, project manager, leadership, leadership competencies.

SYSTEMATIC LITERATURE REVIEW OF PROJECT MANAGER'S LEADERSHIP COMPETENCIES

1. INTRODUCTION

Competence is an area of work, competency is the ~~behavior~~behaviour supporting an area of work, and competencies are the attributes underpinning a ~~behavior~~behaviour (Moore, Cheng, and Dainty, 2002). The topic of project manager's leadership competencies has been cited as a critical success factor for determining either the success or failure of a project, which is an area of much debate in the literature (Nixon et al., 2012). Indeed, leadership competencies have been defined as "a cluster of related knowledge, attitudes, skills, and other personal characteristics that affect a major part of one's job, correlates with performance on the job, can be measured against well-accepted standards, can be improved via training and development, and can be broken down into dimensions of competencies" (Limsila and Ogunlana, 2008). On this matter, Woodruffe (1991) articulated that competence is an ability to perform a task successfully. According to Crawford (2007), the competencies of project management personnel and project success can be closely related to each other. According to the dictionary definition, the word competency and competence are readily interchangeable (Moore et al., 2002). However, the influence of a project manager's leadership competencies in achieving project success appears to have been ignored in most of the project management studies (Turner and Muller, 2005).

Project management is a key skill-set related to the area of engineering, construction and architectural management (Ahuja et al., 1994), since clearly built environment and civil engineering work is designed and delivered according to specified and agreed projects. Researchers have explored this area from a theoretical perspective, for instance, investigating the relationship between construction project management theory and transaction cost economics

(Walker and Kwong Wing, 1999). Other researchers have assessed how to improve the performance of the earned value analysis technique as a construction project management tool (Howes, 2000) and the development of a diagnostic framework and health check tool for engineering and technology projects (Philbin and Kennedy, 2014). Although it has also been reported that this sector faces a number of major challenges associated with managing projects as identified by Wilkinson (2001), where many of the fundamental problems associated with managing construction projects were found to be relationship-based. In this context, new processes can be deployed in order to improve the management of relationships on construction projects, e.g. through adopting a lean construction management (LCM) model via a number of visual tools in order to support the planning and control process in a systematic manner (Brady et al., 2018). Such developments in the construction sector do however rest on the ability to enhance the leadership competencies of project managers as part of wider soft skills (Zuo et al., 2018), so that they are able to adopt and integrate new working practices and ultimately ensure the successful delivery of engineering projects.

~~During the last few decades, a significant amount of research has been conducted in the field of project management but there remain a number of major challenges associated with managing projects.~~ Traditional project management approaches support delivery of the project in accordance with schedule, budget, scope, and quality requirements (Kerzner, 2017). However as mentioned previously, many authors point to the continued difficulties that projects encounter and especially those that involve technological or engineering complexity (Philbin, 2008), for instance in the construction engineering (Flyvbjerg, 2007) and IS/IT (information science/information technology) sectors (Patanakul, 2014) ~~and construction engineering sectors (Flyvbjerg, 2007).~~

1
2
3 Consequently, new methodologies have been proposed, such as the Shenhar and Dvir (2007)
4 approach of viewing project success from a broader perspective and the need to ensure project
5 management arrangements are tailored to the specific project situation (i.e. related to the
6 contingency theory) since not all projects are the same (Nicholas ~~&~~ and Steyn, 2017). ~~Indeed~~
7
8 Moreover, project success consists of criteria or standards, which assess project results or
9 outcomes (Creasy and Anantatmula, 2013) and include both short-term success (namely cost,
10 schedule, scope and quality) and long-term success (such as customer satisfaction, team
11 satisfaction, organizational success and preparing for future) (Ahmed and Azmi, 2016).
12
13
14
15
16
17
18
19
20
21
22
23

24 A further major trend has been the increasing adoption of agile project management practices
25 (Highsmith, 2009), where a range of agile tools and techniques are applied to ensure project
26 delivery. Although with this approach, there can be a need to change or even reduce the project
27 specification in order for the project to remain on track according to the schedule and budgetary
28 requirements. Nevertheless the agile movement continues to build momentum and the initial
29 technology and industrial applications are now being extended into other sectors, such as managing
30 projects in the higher education sector (Philbin, 2017). Although these approaches provide
31 different perspectives on project management, the role of the project manager, and the leadership
32 skills that are associated with the role remain central to the performance of any project (Müller &
33 Turner, 2007b). Moreover, empirical studies can be pursued to achieve this goal but an important
34 approach to properly probe and survey the current state of knowledge in a specific area is to adopt
35 a systematic literature review.
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3 The literature review is an important tool for research in order to manage the diversity of
4 knowledge arising from an academic inquiry (Tranfield et al., 2003). In contrast, a Systematic
5 Literature Review (SLR) differs from traditional literature reviews, since the method adopts a
6 scientific, transparent and repeatable process to mitigate bias and provide an audit trail for the
7 conclusions of the study. According to Klassen et al. (1998, p. 700), a systematic literature review
8 is “a review in which a comprehensive search for relevant studies on a specific topic, and those
9 identified are then appraised and synthesized according to a pre-determined explicit method”.
10
11 Consequently, the SLR approach provides clarity, transparency, and impartiality as well as
12 inclusive coverage in a particular area (Thorpe et al., 2005). SLRs are used for comprehensive,
13 objective, and systematic reporting of previous research studies and are often contrasted with
14 traditional literature reviews (Weed, 2005). Furthermore, Parris and Peachey (2013) have argued
15 that there is a current knowledge gap in regard to how to conduct an effective systematic literature
16 review, how to integrate the arising conclusions, and how to critically assess studies through
17 synthesis of the findings. It is therefore critical when using the SLR approach to ensure a rigorous
18 treatment of the literature results is achieved, thereby maintaining the empirical nature of the
19 technique and also allowing synthesis of the findings to generate outputs and insightful findings
20 that adequately further the scope of the literature in the area of interest.
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43

44 In the field of the project manager’s leadership competencies, systematic literature reviews are
45 limited. Therefore, in this paper, we identified different criterion words from the literature that
46 were searched through selecting appropriate databases on project manager’s leadership
47 competencies. The systematic literature review of project manager’s leadership competencies
48 reveals that two dominant review studies have been conducted during the last decade; firstly by
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3 Turner and Müller (2005) on the project manager's leadership style as a project success factor, and
4
5 secondly by Nixon et al. (2012) on the significance of project manager's leadership performance
6
7 towards project success or failure. Apart from these two review studies, there is presently a scarcity
8
9 of articles synthesizing research studies on project manager's leadership competencies and/or
10
11 styles. Conversely and during the last decade systematic literature reviews were conducted by
12
13 León and Farris (2011) and Hoppmann et al. (2011) that focused on the subject of lean product
14
15 development. Systematic literature reviews are therefore a recognized methodology in order to
16
17 investigate a field and allow scholars to survey the current and emerging trends in a given area.
18
19
20
21
22
23
24

25 Müller and Turner (2007b) previously conducted a study on 'matching the project manager's
26
27 leadership style to project type' and used three types of leadership competencies (namely
28
29 intellectual, managerial and, emotional) to measure leadership style. Leadership competencies are
30
31 a combination of knowledge, skills, and personality characteristics that leads to superior results
32
33 (Crawford, 2007), while leadership style is a joint outcome of the leader's personal traits, self-
34
35 related cognitive information, and the underlying motives to understand operation situation (Toor
36
37 & Ofori, 2006). Nevertheless, Müller and Turner (2007b) used leadership competencies as the
38
39 focus of their work but concluded that the project manager's leadership style influences project
40
41 success, and different leadership styles may be appropriate for different types of projects. These
42
43 assertions potentially create a misunderstanding in the literature regarding the apparent disparity
44
45 between leadership competencies and leadership styles. In order to avoid this situation, both terms
46
47 can be used interchangeably.
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3 A literature review was conducted by Turner and Müller (2005) on whether the project manager's
4 leadership style is a success factor for projects, and whether its impact can be different for different
5 types of projects. They found that the literature on project success factors did not typically cite the
6 project manager's leadership style or competencies as a critical success factor for projects.
7 Although the Turner and Müller (2005) study was comprehensive through focusing on the project
8 manager's leadership styles, it was not however based on use of the systematic literature review
9 methodology. Conversely, Hollenbeck et al. (2006) discussed models for leadership competencies,
10 but were limited to theoretical assumptions since the objective of the study was neither to develop,
11 test or validate any specific model for leadership competencies. The Nixon et al. (2012) study was
12 limited to exploring how the performance of project manager's leadership determines the project
13 outcomes. Thus, the SLR method has not been employed to conduct studies on project manager's
14 leadership competencies, nor prioritize leadership competencies of a project manager. Therefore,
15 the SLR study reported here was designed to fill these gaps and address the following research
16 questions: a) Which leadership competencies of the project manager have been investigated and
17 what is their frequency in literature? b) Do project manager's leadership competencies have any
18 category or priority in the literature? c) Are there any limitations of research methods and sample
19 size ~~based on~~ published empirical studies ~~published from 2005 to 2017?~~ and d) What are the key
20 implications for academicians and the practicing project manager based on these research studies?
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47

48 The SLR study reported here significantly contributes to the existing body of knowledge on
49 construction, engineering and project management as earlier review studies related to project
50 manager's leadership ~~and~~ were only focused on certain more narrow aspects. Namely, identifying
51 leadership competencies including personality and leadership styles of the project manager as a
52
53
54
55
56
57
58
59
60

1
2
3 success factor for projects; suggesting that different competency profiles are appropriate for
4
5 different types of projects (Turner and Müller, 2005); and exploring how leadership performance
6
7 in project management can determine project outcomes (Nixon et al., 2012). Although these
8
9 review studies emphasized researchers' efforts to conceptualize and operationalize project
10
11 manager's leadership competencies, however, none of the review studies were based on the SLR
12
13 methodology. Therefore, this study aims to bridge the gap through utilizing the SLR methodology
14
15 to synthesize project manager's leadership competencies based on [published empirical](#) research
16
17 studies ~~published over a period of 13 years (2005 to 2017)~~. ~~This~~ The focus of this research study
18
19 was to evaluate only empirical research time period was selected so as to provide a comprehensive
20
21 perspective on project manager's leadership competencies ~~the research studies undertaken~~, while
22
23 ensuring the studies represent the latest developments and therefore provide a view on the 'state
24
25 of the art' of the field.
26
27
28
29
30
31
32

33 The structure of this paper is as follows. Firstly, there is a summary of the origins of project
34
35 manager's leadership competencies in order to generate the aforementioned research questions
36
37 based on relevant theory. This is accompanied by further introductory material on project
38
39 management challenges in the context of project manager's leadership competencies. Then, a
40
41 summary of the systematic literature review method is provided, including details of the exclusion
42
43 and inclusion criteria, databases searched, searched items, research design, sample size, and matrix
44
45 method. Next, the article presents the analysis of research studies followed by discussion of
46
47 findings of the systematic literature review on project manager's leadership competencies that is
48
49 derived from 60 research studies. Thereafter, the article explains the methodological contribution
50
51
52
53
54
55
56
57
58
59
60

of the systematic literature review method in the field of project management. Finally, the conclusions are presented, including implications, limitations, and suggestions for future research.

2. METHODS

2.1 Searched Keywords

The published articles investigating project manager's leadership, leadership competencies, leadership styles, or related areas ~~during a thirteen-year period (from 2005 to 2017)~~ were searched from different databases. Following the Padalkar and Gopinath (2016) approach, the focus of the searches was limited to titles and abstracts of articles published in the project management literature and this was done in order to ensure that the articles included an adequate level of detail on project management and associated leadership competencies. As suggested by de Araújo, Alencar, and de Miranda Mota (2017), an initial search was performed through various databases based on different keywords, including the following: "leadership competencies", "leadership styles", "project leadership", "project manager's leadership", "leadership competencies and styles", "project manager's leadership competency", "project manager's leadership style", and "leadership and project success". The numbers of publications per keywords in each bibliographic database are provided in Table 1.

Insert Table 1. Number of publications per keyword searched from bibliographic databases

2.2 Searched Databases

The search for published articles ~~from 2005 to 2017 (i.e. over a 13-year period)~~ was conducted in a systematic manner following the order of listed databases and according to the aforementioned

1
2
3 keywords and key phrases based on the methodologies of Busalim (2016) and de Araújo, Alencar,
4 and de Miranda Mota (2017). The systematic literature review included searching in the following
5
6 electronic databases: Cambridge Journals, EBSCOHOST, Emerald, IEEE, JSTOR, SAGE
7
8 Journals, Science Direct, Scopus, Taylor and Francis, Web of Science, and Wiley Online. The
9
10 published titles and abstract of articles were reviewed by the researchers for inclusion in this
11
12 research study. Furthermore, all search results were limited to peer-reviewed journal articles
13
14 published in English.
15
16
17
18
19
20
21

22 **2.3 Research Design**

23
24 Abstracts were retained for the following steps in the research study if they included the terms: a)
25
26 project manager's leadership; b) leadership competencies, or project manager's leadership
27
28 competencies; c) leadership styles or project manager's leadership styles; d) project leadership
29
30 reference to project success, project performance, or organizational performance. This method
31
32 ensured that the publications had the necessary coverage of project manager's leadership
33
34 competencies. Abstracts satisfying these criteria were ranked as one (1), or two (2), according to
35
36 the significance of the content and empirical results. Following the methods by Ali and Miller
37
38 (2017) and Igarashi, de Boer, and Fet (2013), a number of steps followed and the appropriate
39
40 ranking criteria that were used during the abstract and the article selection process, which are
41
42 illustrated in Figure 1. Based on this initial review, articles with non-relevant results or those
43
44 containing searched keywords only in the background or discussion were ranked at three (3) and
45
46 subsequently excluded. The rank one (1) and two (2) abstracts were reviewed in detail and retained
47
48 for complete review of the articles based on the presence of the key terms, i.e. project manager's
49
50 leadership, leadership competencies, styles, or project leadership in all major sections of articles.
51
52
53
54
55
56
57
58
59
60

1
2
3
4
5 **Insert** Figure 1. Research design flow chart for systematic literature review (SLR)
6
7
8
9

10 **2.4 Exclusion and Inclusion Criteria**

11 We followed the Igarashi, de Boer, and Fet (2013) methodology to develop exclusion and inclusion
12 criteria for selection of the articles. The initial search required that the articles included in the
13 review were studies that must: i) be published in the English Language; ii) be published in peer
14 reviewed journal; iii) be related to the construction, engineering or project management
15 are published over a 13-year period (2005 to 2017); and iv) include the specific searched
16 keywords. The corresponding numbers of articles found using specific keywords in a given period
17 of time from each database are summarized in Table 1. In the next step, the researcher scrutinized
18 if there were any duplicate publications from the databases that were searched. Next, the researcher
19 recorded the number of duplicates, and then deleted the duplicated journal articles from the last
20 database searched in order to keep a record of total new articles found.
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37

38 The second screening process was conducted to assess the eligibility against inclusion criteria, and
39 then full text articles matching the inclusion criteria were retrieved from the corresponding
40 databases. The inclusion criteria for the second screening required that: i) the published papers
41 should be peer reviewed articles, ii) the papers should discuss project manager's leadership terms
42 in the title or abstract, and iii) the papers examine project manager's leadership theory either
43 qualitatively or quantitatively. Articles were excluded if any of these inclusion criteria were not
44 found in the abstract, results, or discussion sections.
45
46
47
48
49
50
51
52
53
54
55

56 **2.5 Sample Size**

We adopted the procedure developed by Ali and Miller (2017) and the key terms outlined in the inclusion and exclusion criteria section were used to identify peer reviewed articles. The large number of papers identified using searched terms from different databases confirmed that there has been a surge of interest in this matter in the project management literature. A total of 1,780 articles were retrieved from searching the databases and 364 articles were selected based on title analysis following the methodology of Igarashi, de Boer, and Fet (2013). Then, we conducted abstract analysis and removed 162 irrelevant articles. Further, 58 duplicates were deleted and there remained 144 articles matching the initial inclusion criteria. Afterwards, 26 articles were excluded based on inclusion and exclusion criteria, i.e. they did not match the aim of this study. A sample of 118 articles was obtained after screening in accordance with the stated inclusion and exclusion criteria. Then, 58 articles were excluded based on irrelevancy found during text analysis of complete articles, due to the area of focus not being on the subject of project manager's leadership competencies. As a result, a final sample of 60 articles was identified for the full review process in order to synthesize the research studies, which met the inclusion criteria for the systematic literature review on project manager's leadership competencies. Out of these 60 articles, we found 44 empirical studies and 16 theoretical studies during the complete review process, which were drawn from a variety of peer reviewed journals for detailed review. A summary of the publications from the systematic literature review is provided in Table 2.

Insert Table 2. Summary of the publications from the systematic literature review

3. ANALYSIS

1
2
3 The matrix method suggested by Garrard (2013) was employed as the strategy for organizing and
4 abstracting pertinent information from the publications. Consequently, the following information
5
6 abstracting pertinent information from the publications. Consequently, the following information
7
8 was abstracted from each article: (a) the types of leadership competencies based on the findings of
9
10 the research studies (b) the types of research methods and sample sizes used in the studies? (c) the
11
12 main respondents and the origin of the research studies? and (d) the sample size of each empirical
13
14 study. As a result, 60 research studies were identified and synthesized through use of the matrix
15
16 method, ~~which have been published during the 13 year period (from 2005 to 2017)~~. A summary
17
18 of the year of publication for these articles is shown in Figure 2.
19
20
21
22
23

24 **Insert** Figure 2. Summary of the year of publication for the articles from the SLR
25
26
27

28 Analysis of the literature review findings from a broader perspective reveals that project manager
29
30 leadership competencies is an area of concern for project stakeholders regarding performance
31
32 improvement. Similarly, there is a growing interest to identify the leadership competencies or
33
34 styles that are more suited to a project manager and in certain situations, i.e. related to contingency
35
36 theory. Indeed according to Hollenbeck et al. (2006), the current state of knowledge and theories
37
38 may not be extensive enough to build a strong model for leadership competencies that can specify
39
40 the most effective interactions between project stakeholders and the corresponding situations. The
41
42 majority of research on the project manager's leadership competencies consists of developing and
43
44 validating theoretical frameworks, and establishing measurement tools with the intention that
45
46 future scholars can apply these tools to explore project manager's leadership competencies in
47
48 practice. However, a limited amount of research has been undertaken in order to synthesize the
49
50 literature on project manager's leadership competencies. Therefore, the present review was
51
52
53
54
55
56
57
58
59
60

1
2
3 explicitly targeted to explore research studies on project manager's leadership competencies, as
4
5 evidenced from Table 3.
6
7
8
9

10 **Insert** Table 3. Summary of the systematic literature review on project manager's leadership
11
12 competencies.
13
14

15
16
17 Leadership competencies are gaining recognition both in academia and industry. In practice,
18 leadership competencies or their combination vary from person-to-person and project-to-project,
19 and of course this is a feature of the working environment and the people involved. According to
20 the research findings, the popularity of project manager's leadership competencies based on the
21 systematic literature review method is illustrated in Figure 3. This analysis shows the resulting
22 graph for project manager's leadership competencies through analysis of the 44 empirical studies.
23
24 Each axis on the graph represents a specific leadership competency identified through synthesis of
25 this SLR and the corresponding frequency from the literature. On the basis of this synthesis we
26 classified leadership competencies in the following order (starting with the highest first and
27 decreasing in order thereafter): communication (14), developing/growth (13), achieving (12),
28 critical analysis (12), empowering (12), managing resources (12), strategic perspective (12),
29 conscientiousness (11), engaging (11), influence (11), motivation (11), sensitivity (11), vision and
30 imagination (11), emotional resilience (10), intuitiveness (10), self-awareness (10), attentiveness
31 (5), managerial expertise (5), knowledge sharing (5), effectiveness (3), administrative expertise
32 (3), teamwork (3), PM expertise (3), monitor (3), producer (3), cognitive ability (2), decision
33 making (2), helping relationship (2), managing conflict (2), facilitator (2), innovator (2), integrator
34 (2), task proficient (2), extraversion (1), openness (1), mentor (1), broker (1), coordinator (1),
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3 director (1), interpersonal skills (1), experience (1), communicating expectations (1), defining roles
4
5 and responsibilities (1), establishing trust (1), and personal characteristics (1). For further details
6
7 on the top rated leadership competencies see Appendix A.
8
9

10
11
12
13 **Insert** Figure 3. Popularity of project manager's leadership competencies based on SLR
14
15

16
17
18
19
20 Since the focus of this research study was to gain an insight into the research studies that focus on
21
22 the project manager's leadership competencies, we excluded those studies that did not meet this
23
24 criteriathis criterion. The approach adopted in this review entails extensive searches of relevant
25
26 databases with the intension of ensuring, as much as possible, that relevant literature on project
27
28 manager's leadership competencies was identified. The findings of the systematic literature review
29
30 allowed synthesis of the research methods used in 44 empirical studies, which are summarized and
31
32 placed into a matrix, as given in Table 4.
33
34
35

36
37
38 **Insert** Table 4. Summary of research methods of systematic literature review studies.
39
40
41

42
43 This SLR research study consists of a synthesis of 60 research studies. In these articles, leadership
44
45 competencies or styles (i.e. the terms) have often been used and sometimes both terms have been
46
47 used interchangeably to measure these concepts. Most of the studies showed a significant
48
49 association between leadership competencies (or styles) and project performance. A few studies
50
51 demonstrated a significant relationship between leadership competencies and project success or
52
53 project management success, which is shown from a synthesis of project manager's leadership
54
55
56
57
58
59
60

1
2
3 competencies along with authors and years of publication, as presented in Table 3. Moreover,
4 project manager's leadership competencies identified from reviewevaluation of this SLR are
5 placed in different clusters (see Figure 4).
6
7
8
9

10
11
12 **Insert Figure 4. Clusters of Pproject Mmanager's Lleadership Ccompetencies.**
13
14

15
16
17 From the 60 articles considered as part of the systematic literature review, 44 research studies
18 included in this SLR used a variety of sample sizes ranging from less than 50 to above than 1,000.
19 In regard to sample size of the reviewed articles, there were 14% studies with less than 50
20 respondents as sample, 32% having samples between 50 and 100, 23% studies with a sample of
21 more than 100 and less than 200, 20% studies with a sample between 300 and 500, 9% studies
22 having a sample size between 500 and 1,000, and only 2% studies having greater than 1,000 sample
23 size. For further explanation, graphical depiction of sample size used in these research studies is
24 shown in Figure 45.
25
26
27
28
29
30
31
32
33
34
35

36 **Insert Figure 45. Graphical depiction of sample size of SLR studies.**
37
38
39

40
41 Most of the studies measured leadership competencies or styles by using validated or study-
42 specific questionnaires, or structured interviews. Leadership competencies and styles were mostly
43 measured by adopting a validated questionnaire such as a leadership dimension questionnaire
44 (LDQ) and multifactor leadership questionnaire (MLQ), or alternatively with adapted/newly
45 developed questionnaires or through conducting interviews. Project success was generally
46 measured using a self-reported questionnaire including project success assessment questionnaire
47 (PSAQ), which is a standard and well-accepted way of measuring this outcome. The investigative
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3 methods to find relationships used in these studies were varied in terms of the tests used and their
4
5 complexity. The majority of studies used a statistical test, such as Spearman's correlation, simple
6
7 regression, hierarchical regression, and structural equation models, while a few studies did not
8
9 report any significant method for testing hypotheses on the directions or the nature of the
10
11 relationship. A small number of research studies (<10%) conducted interviews to enable data
12
13 analysis and none of the research studies reported adoption of the triangulation method.
14
15
16
17

18
19 The specific search items used to identify articles in this SLR emphasized that there has been a
20
21 surge of interest in the area of project manager's leadership competencies. A total of 202 articles
22
23 were selected based on review of their abstracts and titles containing the searched key items. The
24
25 review of the literature shows that a considerable amount of research has been conducted on project
26
27 manager's leadership competencies or styles, but a limited number of review studies have been
28
29 conducted during the last decade to synthesize research studies on project manager's leadership
30
31 competencies. The review of 60 research studies revealed that: a) there is an ambiguity with
32
33 respect to competencies and styles when both terms are interchangeably used to capture and define
34
35 project manager's leadership, b) leadership competencies have not been categorized or prioritized,
36
37 c) researchers used multiple but limited measurement tools and methods to examine the influence
38
39 of project manager's leadership competencies, and d) there is no standard sample size for
40
41 conducting both qualitative and quantitative studies to support a robust analysis via use of an
42
43 appropriate software package, e.g. SPSS, AMOS, PLS, and NVIVO.
44
45
46
47
48
49
50

51 **4. DISCUSSION OF THE FINDINGS**

52
53
54
55
56
57
58
59
60

1
2
3 Earlier review studies conducted in the field of project management were limited to certain areas,
4
5 for instance to project manager's leadership style as a critical success factor (Turner and Müller,
6
7 2005), performance of project manager's leadership (Nixon et al., 2012), discussion on leadership
8
9 competencies model (Hollenbeck et al., 2006), lean product development (León and Farris, 2011),
10
11 and lean product framework development (Hoppmann et al., 2011). This SLR study has explored
12
13 the application of the systematic literature review method to the case of project manager's
14
15 leadership competencies based on published empirical research studies ~~published over a period of~~
16
17 ~~13 years (from 2005 to 2017)~~. The possibilities of generalization of this study results may
18
19 potentially be limited to the diversity in definitions, SLR, study designs, and measurement methods
20
21 used for leadership competencies, styles, and project success, as well as the variability in the
22
23 methods used to evaluate the association in terms of tests and complexity. We made significant
24
25 effort to prioritize project manager's leadership competencies, synthesized in this SLR, based on
26
27 their ~~popularity frequency in identified from the empirical~~ research studies. We categorized and
28
29 prioritized these leadership competencies into three categories as "high priority", "moderate
30
31 priority", and "low priority", based on means of frequencies, as presented in Table 5.
32
33
34
35
36
37
38
39

40 **Insert** Table 5. Summary of categorization criteria and priority levels matrix.
41
42
43
44

45 This SLR reveals that a number of terms have been used widely in the literature in the context of
46
47 project manager's leadership, which includes competencies, styles, profiles, dimensions, roles, and
48
49 factors. These terms having different concepts and meanings but are being used simultaneously in
50
51 the literature regarding project manager's leadership, and this adds a further complication and
52
53 challenge in regard to interpreting the results from the SLR. In many cases the previous literature
54
55
56
57
58
59
60

1
2
3 has disregarded the need to clearly differentiate between the leadership competencies and styles
4
5 of a project manager as limited evidence has been found from the synthesized literature. ~~To~~In
6
7 order to clarify these contentions, a study conducted by Ahmed and Azmi (2016) differentiated
8
9
10 between leadership competencies and styles, and the study concluded that both leadership
11
12 competencies and styles are different. Therefore, these terms need to be clearly understood and
13
14 used by the researcher and project manager to avoid uncertainty arising when interpreting the
15
16 literature and to support effective strategies for ensuring project outcomes are fully realized.
17
18
19

20
21 A number of studies included in the SLR reported that project manager's leadership competencies
22
23 are often correlated with project success and different leadership competencies may be appropriate
24
25 for different types of projects. Project success is measured through short-term and long-term
26
27 benefits, so project managers should devote increasing energies into rich communication both
28
29 within the project and project environment (Andersen et al. 2006). Consequently, a relationship-
30
31 oriented project manager should be well suited to deliver complex projects. Also, the rich and
32
33 quality experience as well as positive attitude a project manager possesses, ~~there are~~ can lead to
34
35 higher chances of project success. The systematic literature review reported here fills the current
36
37 knowledge gap, allows structured analysis and provides critical synthesis of findings that are
38
39 relevant to project managers in the construction sector. In agreement with Parris and Peachey
40
41 (2013), we not only ascertain the current state of the field in project manager's leadership
42
43 competencies research and the synthesis of divergent studies in this systematic literature review
44
45 but we have also advanced a rigorous methodology for conducting a systematic literature review.
46
47
48
49
50
51

52 53 **5. CONCLUSIONS**

54
55
56
57
58
59
60

1
2
3 Planning and organizing skills are significantly important for an engineering project manager to
4
5 achieve the project objectives of delivery according to budget, schedule, scope, and quality
6
7 requirements. This is especially the case for projects from the built environment and civil
8
9 engineering sector. Synthesis of leadership competencies has revealed that communication and
10
11 developing teams are the most critical for the project manager. These skills are important for a
12
13 project manager to effectively and efficiently manage the engineering project team members and
14
15 other key project stakeholders who have a vested interest in the outcomes of any engineering
16
17 project. This SLR reveals that a project manager possessing certain leadership competencies does
18
19 not necessarily guarantee the successful delivery of engineering projects. However, adoption of
20
21 critical leadership competencies (such as communication, developing/growth, achieving, critical
22
23 analysis, empowering, managing resources, organizational/strategic planning, etc.) by the project
24
25 manager should improve the probability of project success and help to mitigate project risks.
26
27 Moreover, the success, or failure, of any project will be contingent on the specific project
28
29 circumstances as well as less tangible aspects, such as the attitude adopted by the project manager,
30
31 willingness to accept and respond to unforeseen changes as well as personal resilience.
32
33 Nevertheless, our research has identified through empirical research the most popular leadership
34
35 competencies for a project manager. These leadership competencies are particularly needed to
36
37 project managers managing engaged on construction and engineering projects where project
38
39 complexity is high and there are difficult issues and risks that arise. The need for enhanced
40
41 leadership competencies in the construction sector is envisaged to continue and especially in the
42
43 context of the adoption of new technologies associated with new adaptations of BIM and Industry
44
45 4.0; the subsequent technical complexity will require strong leadership competencies across
46
47 engineering projects to ensure the benefits provided by such technologies can be realised.
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3
4
5 This study has addressed the aforementioned research questions ~~identified earlier~~. Project
6 manager's leadership competencies have been synthesized and their frequencies have been
7 reported (research question a). Project manager's leadership competencies have been categorized
8 (research question b). Limitations have been identified for the research methods and sample sizes
9 from studies ~~published from 2005 to 2017~~ included in SLR (research question c). The key
10 implications for academicians and the practicing project manager from the engineering and
11 construction sector have been synthesized based on the research studies from the SLR (research
12 question d).
13
14
15
16
17
18
19
20
21
22
23
24
25

26 This paper has directed efforts to build a chronology of project manager's leadership competencies
27 by synthesizing extensive literature to contribute towards the associated body of knowledge and
28 to enhance our understanding for establishing linkages between project manager's leadership
29 competencies and project outcomes. This work has been positioned in the context of engineering
30 projects and the construction sector. This systematic literature review of the 60 research studies
31 provides evidence regarding the influence of project manager's leadership competencies on
32 engineering projects. The subsequent analysis of available data from the systematic literature
33 review suggests that greater levels of leadership competencies are associated with improved
34 project performance leading to project success. However, future directions suggested by such
35 empirical studies have not yet been significantly addressed and therefore, further research in this
36 area is needed. Although we conducted this SLR in a disciplined manner, there are potential
37 limitations in terms of the measurement methods, study designs, and inconsistency in the results
38 of SLR studies. This SLR has been limited to searching indexed journals available in the selected
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3 databases, which were peer-reviewed and the articles were written in English language. There may
4
5 be research studies on project manager's leadership competencies published in other languages
6
7 that would contradict or complement some of the conclusions drawn from this SLR.
8
9

10
11
12 This SLR was limited to the literature on project manager's leadership competencies published in
13
14 peer-review journals ~~over a 13 year period (from 2005 to 2017)~~. Future studies are suggested to
15
16 consider conducting the SLR method on leadership competencies other than the projects
17
18 ~~management field~~ field to highlight its significance. Also, most of the empirical studies used cross-
19
20 sectional study design and the Likert scale for measurement, which limits the analysis of the
21
22 association between leadership competencies, or styles, and project success. The analysis of
23
24 sample size in this SLR studies reveals that two-thirds of empirical research studies (69%)
25
26 conducted at a country/regional level were limited to a sample of less than 200 responses,
27
28 therefore, we recommend a sample size between 200 and 300 in order to enhance the credibility
29
30 and validity of future research, ensure ~~generalizeability~~ generalizability of results at
31
32 country/regional level, and produce sophisticated results using variety of analysis software.
33
34 Furthermore, we prioritized leadership competencies as 'high priority', 'moderate priority', and
35
36 'low priority' that might be useful in managing complex, large, and small projects, which should
37
38 be considered by future research studies to further investigate and validate the effectiveness of
39
40 these priorities on different types of projects.
41
42
43
44
45
46
47
48

49 Identification ~~The lack of ranking and prioritisation of leadership competencies which are easier or~~
50
51 ~~harder to develop, or that are easier or harder to develop most effective in the architectural,~~
52
53 construction, engineering and project management environment is one of the limitations of this
54
55
56
57
58
59
60

1
2
3 SLR, which is a recommended area for future research. ~~As Furthermore, as~~ the aim of this study
4
5 was to synthesize project manager's leadership competencies based on research studies including
6
7 both empirical studies (44) and theoretical studies (16); however, separate SLRs of empirical and
8
9 theoretical studies were not part of this study due to word count and other constraints. Thus, an
10
11 autonomous SLR of both empirical and theoretical studies may be a further fruitful area for future
12
13 research. Additionally, we suggest conducting interviews and focus group discussions with
14
15 construction, engineering and project management practitioners to provide ~~any~~ future research
16
17 studies with more validity and reliability. Employing a systematic literature review combined with
18
19 engineering practitioner face-to-face and group interviews (i.e. a mixed method) would allow ~~for~~
20
21 triangulation to take place, ~~which would be thereby providing a powerful robust~~ research
22
23 approach ~~for to be employed in~~ future research studies ~~to employ~~.
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3 **REFERENCES**
4
5

- 6 Ahadzie, D., Proverbs, D., & Sarkodie-Poku, I. (2014). Competencies required of project managers
7 at the design phase of mass house building projects. *International Journal of Project*
8 *Management*, 32(6), 958-969.
- 9
10 Ahmed, R., & Anantatmula, V. S. (2017). Empirical Study of Project Manager's Leadership
11 Competence and Project Performance. *Engineering Management Journal*, 29(3), 1-16.
- 12
13 Ahmed, R., & bin Mohamad, N. A. (2014). Mapping Project Manager's Leadership Competencies
14 and Styles to Project Success: A Theoretical Framework. *The Journal of Modern Project*
15 *Management*, 2(2), 39-54.
- 16
17
18 Ahmed, R., & Mohamad, N. A. B. (2016). Differentiating between leadership compencies and
19 styles: A critical review in project management perspective. *International Journal of*
20 *Information Technology Project Management*, 7(1), 58-71.
- 21
22 Ahuja, H. N., Dozzi, S. P., & Abourizk, S. M. (1994). *Project management: techniques in planning*
23 *and controlling construction projects*. John Wiley & Sons.
- 24
25
26 Ali, M., & Miller, L. (2017). ERP System Implementation in Large Enterprises-A Systematic
27 Literature Review. *Journal of Enterprise Information Management*, 30(4), 666-692.
- 28
29 Anantatmula, V. S. (2010). Project Manager Leadership Role in Improving Project Performance.
30 *Engineering Management Journal*, 22(1), 13-22.
- 31
32 Anantatmula, V. S., & Thomas, M. (2010). Managing Global Projects : A Structured Approach
33 for Better Performance. *Project Management Journal*, 41(2), 60-72.
- 34
35 Andersen, E. S. (2016). Do project managers have different perspectives on project management?
36 *International Journal of Project Management*, 34(1), 58-65.
- 37
38 Andersen, E. S., Birchall, D., Jessen, S. A., & Money, A. H. (2006). Exploring project success.
39 *Baltic Journal of Management*, 1(2), 127-147.
- 40
41 Aronson, Z. H., Reilly, R. R., & Lynn, G. S. (2006). The impact of leader personality on new
42 product development teamwork and performance: The moderating role of uncertainty.
43 *Journal of Engineering and Technology Management*, 23(3), 221-247.
- 44
45
46 Avolio, B. J., Reichard, R. J., Hannah, S. T., Walumbwa, F. O., & Chan, A. (2009). A meta-
47 analytic review of leadership impact research: Experimental and quasi-experimental
48 studies. *Leadership Quarterly*, 20(5), 764-784.
- 49
50 Bakar, A. H. A., Razak, A. A., Abdullah, S., & Awang, A. (2009). Project Management Success
51 Factors for Sustainable Housing : A Framework. *Asian Journal of Management Research*,
52 1(1), 66-80.
- 53
54
55
56
57
58
59
60

- 1
2
3 Battilana, J., Gilmartin, M., Sengul, M., Pache, A. C., & Alexander, J. A. (2010). Leadership
4 competencies for implementing planned organizational change. *The Leadership Quarterly*,
5 21(3), 422-438.
6
7 Blaskovics, B. (2016). The impact of project manager on project success—The case of ICT sector.
8 *Society and Economy in Central and Eastern Europe*, 38(2), 261-281.
9
10 Brill, J. M., Bishop, M., & Walker, A. E. (2006). The competencies and characteristics required
11 of an effective project manager: A web-based Delphi study. *Educational Technology
12 Research and Development*, 54(2), 115-140.
13
14 Brady, D. A., Tzortzopoulos, P., Rooke, J., Formoso, C. T., & Tezel, A. (2018). Improving
15 transparency in construction management: a visual planning and control model.
16 *Engineering, Construction and Architectural Management*, 25(10), 1277-1297.
17
18
19 Busalim, A. H. (2016). Understanding social commerce: A systematic literature review and
20 directions for further research. *International Journal of Information Management*, 36(6),
21 1075-1088.
22
23 Chan, A. T. S., & Chan, E. H. W. (2005). Impact of Perceived Leadership Styles on Work
24 Outcomes : Case of Building Professionals. *Journal of Construction Engineering and
25 Management*, 131(4), 413-422.
26
27 Christenson, D., & Walker, D. H. T. (2008). Using vision as a critical success element in project
28 management. *International Journal of Managing Projects in Business*, 1(4), 611-622.
29
30 Clarke, N. (2010). Emotional Intelligence and Its Relationship to Transformational Leadership and
31 Key Project Manager Competencies. *Project Management Journal*, 41(2), 5-20.
32
33 Conforto, E. C., Amaral, D. C., da Silva, S. L., Di Felippo, A., & Kamikawachi, D. S. L. (2016).
34 The agility construct on project management theory. *International Journal of Project
35 Management*, 34(4), 660-674.
36
37 Crawford, L. H. (2007). *Developing the project management competence of individuals*. In:
38 *Turner, J.R., (Ed.), Gower handbook of Project Management*. Aldershot, UK: Gower
39 Publishing.
40
41 Creasy, T., & Anantatmula, V. S. (2013). From every direction—How personality traits and
42 dimensions of project managers can conceptually affect project success. *Project
43 Management Journal*, 44(6), 36-51.
44
45 Curran, C. S., Niedergassel, B., Picker, S., & Leker, J. (2009). Project leadership skills in
46 cooperative projects. *Management Research News*, 32(5), 458-468. de Araújo, M. C. B.,
47 Alencar, L. H., & de Miranda Mota, C. M. (2017). Project procurement management: A
48 structured literature review. *International Journal of Project Management*, 35(3), 353-377.
49
50
51
52
53
54
55
56
57
58
59
60

- 1
2
3 Dolfi, J., & Andrews, E. J. (2007). The subliminal characteristics of project managers: An
4 exploratory study of optimism overcoming challenge in the project management work
5 environment. *International Journal of Project Management*, 25(7), 674-682.
6
7 Dulewicz, V., & Higgs, M. (2005). Assessing leadership styles and organisational context. *Journal*
8 *of Managerial Psychology*, 20(2), 105-123.
9
10 Eweje, J., Turner, R., & Müller, R. (2012). Maximizing strategic value from megaprojects: The
11 influence of information-feed on decision-making by the project manager. *International*
12 *Journal of Project Management*, 1-13. 30(6), 639-651.
13
14 Flyvbjerg, B. (2007). Policy and planning for large-infrastructure projects: problems, causes,
15 cures. *Environment and Planning B: Planning and Design*, 34(4), 578-597.
16
17 Fung, H. P. (2014). Relationships between leadership roles and project team effectiveness as
18 perceived by project managers in Malaysia. *Journal of Empirical Studies*, 1(1), 1-22.
19
20 Galvin, T., Gibbs, M., Sullivan, J., & Williams, C. (2014). Leadership Competencies of Project
21 Managers: An Empirical Study of Emotional, Intellectual, and Managerial Dimensions.
22 *Journal of Economic Development, Management, IT, Finance & Marketing*, 6(1), 35-60.
23
24 Garrard, J. (2013). *Health sciences literature review made easy*: Jones & Bartlett Publishers.
25
26 Gentry, W. A., & Sparks, T. E. (2012). A Convergence/Divergence Perspective of Leadership
27 Competencies Managers Believe are Most Important for Success in Organizations: A
28 Cross-Cultural Multilevel Analysis of 40 Countries. *Journal of Business and Psychology*,
29 27(1), 15-30.
30
31 ~~Geoghegan, L., & Dulewicz, V. (2008). Do Project Managers' Leadership Competencies~~
32 ~~Contribute to Project Success? *Project Management Journal*, 39(4), 58-67.~~
33
34 Geoghegan, L., & Dulewicz, V. (2008). Do Project Managers' Leadership Competencies
35 Contribute to Project Success? . *Project Management Journal*, 39(4), 58-67.
36
37 Gilley, A., Gilley, J. W., McConnell, C. W., & Veliquette, A. (2010). The Competencies That
38 Effective Managers Use to Build Teams: An Empirical Study. *Advances in Developing*
39 *Human Resources*, 12(1), 29-45.
40
41 Highsmith, J. (2009). *Agile project management: creating innovative products*: Pearson
42 Education.
43
44 Hollenbeck, G. P., McCall, M. W., & Silzer, R. F. (2006). Leadership Competencies Models. *The*
45 *Leadership Quarterly*, 17(4), 398-413.
46
47 Howes, R. (2000). Improving the performance of Earned Value Analysis as a construction project
48 management tool. *Engineering, Construction and Architectural Management*, 7(4), 399-
49 411.
50
51
52
53
54
55
56
57
58
59
60

- Hoppmann, J., Rebentisch, E., Dombrowski, U., & Zahn, T. (2011). A Framework for Organizing Lean Product Development. *Engineering Management Journal*, 23(1), 3-15.
- Igarashi, M., de Boer, L., & Fet, A. M. (2013). What is required for greener supplier selection? A literature review and conceptual model development. *Journal of Purchasing and Supply Management*, 19(4), 247-263.
- Ika, L., & Saint-Macary, J. (2012). The Project Planning Myth in International Development. *International Journal of Managing Projects in Business*, 5(3), 1-34.
- Jugdev, K., & Müller, R. (2005). A Retrospective Look at Our Evolving Understanding of Project Success. *Project Management Journal*, 36(4), 19-31.
- Kerzner, H. (2017). *Project management: a systems approach to planning, scheduling, and controlling*. John Wiley & Sons.
- Kaulio, M. (2008). Project leadership in multi-project settings: Findings from a critical incident study. *International Journal of Project Management*, 26(4), 338-347.
- Khanaposhtayi, Q. F., & Abyane, M. B. (2015). Presenting Competence Profile of Successful Project Managers Based on Fuzzy Analytic Analysis Process (FAHP). *Journal of Applied Environmental and Biological Sciences-J. Appl. Environ. Biol. Sci*, 4(5), 70-81.
- Klassen, T. P., Jadad, A. R., & Moher, D. (1998). Guides for reading and interpreting systematic reviews: I. Getting started. *Archives of ~~pediatrics~~Pediatrics & ~~and adolescent~~Adolescent medicine* *Medicine*, 152(7), 700-704.
- Kuen, C. W., Zailani, S., & Fernando, Y. (2009). Critical factors influencing the project success amongst manufacturing companies in Malaysia. *African Journal of Business Management*, 3(1), 16-27.
- Larsson, J., Eriksson, P. E., Olofsson, T., & Simonsson, P. (2015). Leadership in civil engineering: Effects of project managers' leadership styles on project performance. *Journal of Management in Engineering*, 31(6), 401-411.
- León, H. C. M., & Farris, J. A. (2011). Lean Product Development Research: Current State and Future Directions. *Engineering Management Journal*, 23(1), 29-51.
- Limsila, K., & Ogunlana, S. O. (2008). Linking Personal Competencies with Transformational Leadership Style Evidence from the Construction Industry in Thailand. *Journal of Construction in Developing Countries*, 13(1), 27-50.
- Lloyd-Walker, B., & Walker, D. (2011). Authentic leadership for 21st century project delivery. *International Journal of Project Management*, 29(4), 383-395.
- Lunenburg, F. C. (2011). Leadership versus Management: A Key Distinction - At Least in Theory. *International ~~journal~~Journal of ~~management~~Management, ~~business~~Business and ~~administration~~Administration*, 14(1), 1-4.

- 1
2
3 Malach-pines, A., & Dvir, D. (2008). Project manager-project (PM-P) fit and project success.
4 *International Journal of Operations & Production Management*, 29(3), 268-291.
- 5
6 Medina, R., & Medina, A. (2014). The project manager and the organisation's long-term
7 competence goal. *International Journal of Project Management*. 32(8), 1459-1470.
- 8
9 Montequin, V., Nieto, A., Ortega, F., & Villanueva, J. (2015). Managerial style profiles of
10 successful project managers: a survey. *Procedia Computer Science*, 64(1), 55-62.
- 11
12 Moore, D. R., Cheng, M.-I., & Dainty, A. R. (2002). Competence, competency and competencies:
13 performance assessment in organizations. *Work Study*, 51(6), 314-319.
- 14
15 Morgeson, F. P., DeRue, D. S., & Karam, E. P. (2010). Leadership in Teams: A Functional
16 Approach to Understanding Leadership Structures and Processes. *Journal of Management*,
17 36(1), 5-39.
- 18
19 Moynihan, D. P., Pandey, S. K., & Wright, B. E. (2012). Setting the Table: How Transformational
20 Leadership Fosters Performance Information Use. *Journal of Public Administration
21 Research and Theory*, 22(1), 143-164.
- 22
23 Muller, R., Geraldi, J., & Turner, R. J. (2012). Relationships Between Leadership and Success in
24 Different Types of Project Complexities. *IEEE Transactions on Engineering Management*,
25 59(1), 77-90.
- 26
27 Müller, R., & Turner, R. J. (2007a). Influence of project managers on project success criteria and
28 project success by type of project. *European Management Journal*, 25(4), 298-309.
- 29
30 Müller, R., & Turner, R. J. (2007b). Matching the project manager's leadership style to project
31 type. *International Journal of Project Management*, 25(1), 21-32. Müller, R., & Turner, R.
32 J. (2010a). Attitudes and leadership competences for project success. *Baltic Journal of
33 Management*, 5(3), 307-329.
- 34
35 Müller, R., & Turner, R. J. (2010b). Leadership competency profiles of successful project
36 managers. *International Journal of Project Management*, 28(5), 437-448.
- 37
38 Nahod, M. M., Vukomanovi, M., & Radujkovi, M. (2013). The Impact of ICB 3.0 Competences
39 on Project Management Success. *Procedia - Social and Behavioral Sciences*, 74(1), 105-
40 115.
- 41
42 Nicholas, J. M., & Steyn, H. (2017). *Project management for engineering, business and
43 technology*: Taylor & Francis.
- 44
45 Nixon, P., Harrington, M., & Parker, D. (2012). Leadership performance is significant to project
46 success or failure: a critical analysis. *International Journal of Productivity and
47 Performance Management*, 61(2), 204-216.
- 48
49 Obradovica, V., Jovanovicb, P., Petrovica, D., Mihica, M., & Mitrovica, Z. (2013). Project
50 Managers' Emotional Intelligence - A Ticket to Success *Procedia - Social and Behavioral
51 Sciences*, 74(1), 301-311.
- 52
53
54
55
56
57
58
59
60

- 1
2
3 Padalkar, M., & Gopinath, S. (2016). Six decades of project management research: Thematic
4 trends and future opportunities. *International Journal of Project Management*, 34(7),
5 1305-1321.
6
7 Parris, D. L., & Peachey, J. W. (2013). A systematic literature review of servant leadership theory
8 in organizational contexts. *Journal of Business Ethics*, 113(3), 377-393.
9
10 Patanakul, P. (2014). Managing large-scale IS/IT projects in the public sector: Problems and
11 causes leading to poor performance. *Journal of High Technology Management Research*,
12 25(1), 21-35.
13
14 Philbin, S. P. (2008). Managing complex technology projects. *Research-Technology Management*,
15 51(2), 32-39.
16
17 Philbin, S. P., & Kennedy, D. A. (2014). Diagnostic framework and health check tool for
18 engineering and technology projects. *Journal of Industrial Engineering and Management*,
19 7(5), 1145-1166.
20
21
22 Philbin, S. P. (2017). Investigating the Scope for Agile Project Management to Be Adopted by
23 Higher Education Institutions. In *Software Project Management for Distributed Computing*
24 (pp. 345-366). Springer International Publishing.
25
26 Prabhakar, G. P. (2005). An Empirical Study Reflecting the Importance of Transformational
27 Leadership on Project Success Across Twenty-Eight Nations. *Project Management*
28 *Journal*, 36(4), 53-60.
29
30 Prabhakar, G. P. (2008). What is Project Success-: A Literature Review. *International Journal of*
31 *Bussiness and Management*, 3(9), 3-10.
32
33 Qureshi, T. M., Warraich, A. S., & Hijazi, S. T. (2009). Significance of project management
34 performance assessment (PMPA) model. *International Journal of Project Management*,
35 27(4), 378-388.
36
37 Shao, J., Müller, R., & Turner, J. R. (2012). Measuring Program Success. *Project Management*
38 *Journal*, 43(1), 37-49.
39
40 Shenhar, A. J., & Dvir, D. (2007). *Reinventing project management: The diamond approach to*
41 *successful growth and innovation*. Boston, MA: Harvard Business School Press.
42
43 Shibru, B., & Darshan, G. M. (2011). Transformational Leadership and its Relationship with
44 Subordinate Satisfaction with the Leader (-The case of Leather Industry in Ethiopia).
45 *Interdisciplinay Journal of Contemporary Research in Business*, 3(5), 686-697.
46
47 Shokrzadesh, S., Sabbaghian, Z., Pardakhtchi, M. H., & Abolghasemi, M. (2012). Knowledge-
48 oriented roles of managers and its relationship to knowledge management process. *African*
49 *Journal of Business Management*, 6(4), 1667-1673.
50
51
52
53
54
55
56
57
58
59
60

- 1
2
3 Tabassi, A. A., Roufechaei, K. M., Ramli, M., Bakar, A. H. A., Ismail, R., & Pakir, A. H. K.
4 (2016). Leadership competences of sustainable construction project managers. *Journal of*
5 *Cleaner Production*, *124*(2), ~~124~~(15), 339-349.
- 6
7
8 Thorpe, R., Holt, R., Macpherson, A., & Pittaway, L. (2005). Using knowledge within small and
9 medium-sized firms: A systematic review of the evidence. *International Journal of*
10 *Management Reviews*, *7*(4), 257-281.
- 11
12 Toor, S. R., & Ofori, G. (2006). An antecedental model of leadership development. Paper
13 presented at the *Joint ~~international~~ International symposium-Symposium of CIB working*
14 *Working ~~commissions~~ Commissions*, Rome, Italy.
- 15
16
17 Tranfield, D., Denyer, D., & Smart, P. (2003). Towards a methodology for developing
18 evidence-informed management knowledge by means of systematic review. *British*
19 *Journal of Management*, *14*(3), 207-222.
- 20
21 Tseng, S.-M. (2017). Investigating the moderating effects of organizational culture and leadership
22 style on IT adoption and knowledge sharing intention. *Journal of Enterprise Information*
23 *Management*, *30*(4), 583-604.
- 24
25
26 Turner, J. R., & Müller, R. (2005). The Project Manager's Leadership Style as a Success Factor
27 on Projects: A Literature Review. *Project Management Journal*, *36*(2), 49-61.
- 28
29 Walker, A., & Kwong Wing, C. (1999). The relationship between construction project
30 management theory and transaction cost economics. *Engineering, Construction and*
31 *Architectural Management*, *6*(2), 166-176.
- 32
33
34 Weed, M. (2005). " *Meta Interpretation*": A Method for the Interpretive Synthesis of Qualitative
35 *Research*. Paper presented at the Forum Qualitative Sozialforschung/Forum: Qualitative
36 Social Research. *6*(1), 1-17.
- 37
38 Wilkinson, S. (2001). An analysis of the problems faced by project management companies
39 managing construction projects. *Engineering, Construction and Architectural*
40 *Management*, *8*(3), 160-170.
- 41
42
43 Woodruffe, C. (1991). Competent by any other name. *Personnel Management*, *23*(9), 30-33.
- 44
45 Yang, L.-R., Wu, K.-S., & Huang, C.-F. (2013). Validation of a Model Measuring the Effect of a
46 Project Manager's Leadership Style on Project Performance. *KSCE Journal of Civil*
47 *Engineering*, *17*(2), 271-280.
- 48
49 Ying, C. Y., Ken, S., & Ting, T. (2012). Emotional Intelligence and Transformational Leadership
50 Outcomes : Insights from a Malaysian Perspective. *World Journal of Social Sciences*, *2*(2),
51 151-160.
- 52
53
54 Zhang, L., & Cheng, J. (2015). Effect of knowledge leadership on knowledge sharing in
55 engineering project design teams: the role of social capital. *Project Management Journal*,
56 *46*(5), 111-124.
- 57
58
59
60

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Zuo, J., Zhao, X., Nguyen, Q. B. M., Ma, T., & Gao, S. (2018). Soft skills of construction project management professionals and project success factors. *Engineering, Construction and Architectural Management*, 25(3), 425-442.

Engineering, Construction and Architectural Management

Appendix A: Further details on the top-rated leadership competencies

Communication:

Clearly communicate vision and instructions among project team members and establish formal communication channels among stakeholders.

Developing/ growth:

Develop competencies and invest efforts in coaching for growth of others to contribute effectively in projects.

Achieving:

Focus to achieve project objectives and take decisions based on core issues as well as mitigate significant risks.

Critical analysis and judgment:

Critically probe the project issues to identify advantages, disadvantages, and shortcomings as well as make sound judgments and decision based on realistic assumptions.

Empowering:

Encourage project team members and give autonomy to take challenging tasks as well as solve problems and produce innovative ideas.

Managing resources:

Transform project objectives and long-term goals into action plans through forward planning and organizing resources, and regular monitoring of team members' work through providing constructive and honest feedback.

Organizational/ Strategic perspective:

Consider and analyze project issues from a broader perspective, and identify opportunities and threats to balance short-term and long-terms implications of the project.

Conscientiousness:

Demonstrate commitment to pursue an ethical solution to a challenging issue and encourage the project team to support the chosen direction.

Engaging:

Engage team members to achieve project objectives through enthusiastic and lively interaction.

1
2
3 **Influence:**

4 Encourage project team members to provide their views based on logic and their position through
5 recognizing the need to listen and giving a rational premise for change.
6
7

8 **Motivation:**

9
10 Motivate project team members through energy and drive to attain project objectives with the
11 ability to face rejection or questioning.
12
13

14 **Sensitivity/ Agreeableness:**

15 Aware of needs and perceptions of project team to arrive at decisions and suggest balanced
16 solutions to challenges and problems.
17
18

19 **Vision and imagination:**

20 Establish sound priorities for future work with a clear and innovative vision of the future direction
21 of the organization to meet project and longer-term business objectives.
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60