

SUSTAINABLE PROJECT MANAGEMENT PRACTICE AND FIRM PERFORMANCE: A SYSTEMATIC REVIEW OF THE EVIDENCE

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Abstract

The concept of sustainable project management (SPM) has been the focus of much discussion in both industry debates and empirical research. Many organizations have claimed to adopt SPM practice as a competitive strategy. However, the impact of SPM on firm performance is unknown. The aim of this study was to conduct a systematic review of the literature on the relationship between sustainable project management practices and firm performance. The findings showed that sustainable project management practice has many advantages, including improved competitive advantage and better long term economic performance as measured by long-term profitability, return on assets (ROA), cash flow from operating activities, and better earnings quality. Companies that adopted SPM also reported improved customer satisfaction, lower operating cost in the long-term, better quality performance, increased innovative capabilities, high employee satisfaction, and improved organizational image. The study found evidence that organizational culture, stakeholder engagement, top management commitment, and employee training are important mechanisms that activate the relationship between SPM practices and firm performance. The systematic review revealed the need for further empirical research on sustainable project management practices and organizational performance. There is, in particular, a need to better understand how market dynamics impact SPM implementation. The systematic review also highlighted implications for both executives and project management professionals.

Keywords: sustainable project management, sustainability in project management, firm performance, systematic review

Sustainable Project Management and Firm Performance

The last two decades have seen a growing interest in sustainability practices in organizations. What seemed to start as a mere public relation (PR) strategy in the early 1990s (Savitz, 2013) has become a long-term competitive advantage for many organizations (Gupta & Benson, 2011). One of the sub-fields of sustainable management that has been receiving much greater attention in recent years is sustainable project management (SPM). Many organizations have adopted SPM practices as a means of achieving a long-term competitive advantage, and there is growing amount of literature on the subject. This vast and scattered literature can be assembled across specialized journals (Eilers, Chong, Kim, Naganathan, & Glavinich, 2016; Maletič, Maletič, & Gomišček, 2016; Renard, Balatbat, & Carmichael, 2013) and mainstream management journals (Ameer & Othman, 2011; Bryson & Lombardi, 2009).

This growing interest in sustainability practices in both organizations and research has created a need for educators to integrate sustainability into management education (Baumgartner & Winter, 2014; Gitsham, & Clark, 2014; Rusinko, 2010) and engineering education (Byrnes, Desha, Fitzpatrick, & Hargroves; 2013; Valdes-Vasquez & Klotz, 2011). These authors highlighted the importance of sustainability practices for the success of sustainable development. The argument is that culture is heavily influenced by education (Baumgartner, 2009; Schein, 2010), and therefore, creating a foundation for sustainability must start as early as possible and must focus on education as a key lever.

Despite this increased focus on educating management professionals about sustainability and incorporating SPM into organizational processes, the evidence supporting the impact of SPM on firm performance remains incomplete and somewhat contradictory. Sustainability terminologies are defined in varied ways and used inconsistently, different authors in different fields have used different measures of performance, and research results have become scattered and confusing for

practitioners. Furthermore, there is no collective body of evidence conceptualizing the implications of SPM practices for business performance.

Prior systematic reviews related to sustainability have focused on corporate social responsibility and financial performance (Orlitzky, Schmidt, & Rynes, 2003), sustainable supply chain management practices and firm performance (Golicic & Smith, 2013), and more recently on sustainability performance and financial performance (Lu & Taylor, 2016).

This systematic review addressed one practical question: what is the impact of sustainable project management practices on firm performance? The objective of the study was to answer this research question by developing a theoretical framework which could provide researchers, decision makers, and project management professionals a better understanding of the critical success factors that explain the relationship between SPM practices and firm performance and, at the same time, identify areas of focus for future research.

Methodology

This study utilized systematic review as a research method to conceptualize a collective body of evidence (Briner, Denyer, & Rousseau, 2009, Denyer & Tranfield, 2009) on the relationship between sustainable project management practices and firm performance. This research method is appropriate when there is a growing body of literature on a topic with unclear and contradictory conclusions and when a more conclusive perspective is desired to solve a management problem or to answer an important review question (Petticrew & Roberts, 2006). As defined in the review protocol and as defined in this paper, a systematic review is the process of analyzing “all studies relevant to a particular question in an explicit, transparent fashion in order to provide the best available answer” (Rousseau, 2012, p. 7). The following sections explain the steps of the review process.

Scope and Definition

A very important step in the systematic review process is to define the boundaries of the review (Tranfield, Denyer, & Smart, 2003). This boundary definition is particularly important in management research due to the lack of consensus in management terminologies and methodologies (Rousseau, 2005; Rousseau, Manning, & Denyer, 2008). For example, sustainability is a vague term and the dictionary definition may lead to confusion in the context of this research. This terminology issue adds an element of complexity in the literature search process. For the purpose of this research, the term sustainability is defined as the integration of economic viability, environmental protection, and social responsibility into project and operations processes of an organization (Elkington, 1998; Hopkins et al., 2009; World Commission on Environment and Development, 1987). Consistent with a definition proposed by Silvius and Schipper (2014), sustainable project management may be defined as an integrative project management approach which seeks to meet stakeholders' existing needs and requirements including business and project requirements and at the same time addresses the future performance of the business. Project management is an umbrella term used by the project management institute (PMI) to describe "the application of knowledge, skills, tools, and techniques to project activities to meet project requirements" (Project Management Institute, 2013, p.5). A project is any "temporary endeavour undertaken to create a unique product, service, or result" (PMI, 2013, p. 1). A firm is any business organization involving in the production of goods and/or services by using a variety of processes, resources, tools, and techniques. A firm is constrained by resource availability and environmental factors and is guided by its objectives or goals. A firm's performance is measured across a variety of indicators, including financial and non-financial, short- and long-term, internal and external measures (Figge, Schaltegger, Wagner, 2002; Kaplan & Norton, 2007; Möller, & Schaltegger, 2005; Hansen, & Schaltegger, 2016). This review

examines the impact of sustainable project management practices on profit-oriented organizations, regardless of geographic location, size, and revenue.

The Search Process

Once the boundaries of the review were clarified and key terms were defined, the reviewer used the "building blocks" bibliographic search approach to develop search strings or query formulations for electronic databases (Goodman, Gary, & Wood, 2014). The review question served as the basis for identifying the keywords that retrieved primary studies and research reports from electronic databases. The current literature also guided this step of the process (Booth, Papaioannou, & Sutton, 2016). Keywords and key phrases identified and used in search strings included: sustainable, sustainability, sustainability practice, project, project management, sustainable project management, sustainable project management practice, firm performance, organization performance, and business performance. These keywords and phrases formed the strings that were used in the following electronic databases: ABI/INFORM Complete, Academic Search Complete, Business Source Complete, Emerald Insight, ProQuest Dissertations, Scopus, and (ISI) Web of Science. Boolean operators (e.g., AND & OR) enabled the fine-tuning of search strings. Truncation was used to ensure that alternative spelling and synonyms for major terms relating to the review question were included in the search results. The English language filter option was not used in the search process to avoid language bias. The search string that retrieved all the primary studies included in the systematic review is shown in Table 1

Table 1
Search string for “Sustainable Practices & Firm Performance

(“Sustainable practice*” OR “sustainability practice*”) AND (“organi* performance” OR “firm performance” OR “business performance” OR “enterprise performance” OR “organi* effectiveness” OR “firm effectiveness” OR “business effectiveness” OR “enterprise effectiveness” OR “organi* success” OR “firm success” OR “business success” OR “enterprise success”)

The search string shown in Table 1 was modified according to the preferred coding language of each database. For example, ABI/INFORM Complete did not recognize the language when words from the first part of the string were truncated. While “Sustaina* practice” worked in EBSCOhost, it did not returned any results in ABI/INFORM Complete; therefore, full words and their synonyms were used in ABI/INFORM as shown in Table 1. The search string at the bottom of Table 1 was developed and used in 8 databases to retrieve the articles used in this study. The PRISMA diagram (Moher et al., 2009) located in Appendix A explains the process used to arrive at the final studies included in the review (see Table E1 in Appendix E for a complete list of the primary research studies). However, Figure 1 depicts a clearer picture of the search process.

Step 1: Define the scope of the research. As explained above, defining the scope of the research is a key step of the review process. It allows the reviewer to understand the boundaries of the research project. Defining the scope of the research as applied in this case is different from a scoping review (see the Centre for Reviews and Dissemination, 2009, Gough et al., 2012).

Step 2: Identify keywords and key phrases. As also explained above, the research question and the current literature served as input for identifying the facets of the search strings.

Step 3: Develop search strings. Keywords and key phrases identified in step 2 are combined

with Boolean operators and truncated, in some cases, to form the search strings.

Step 4: Identify and search electronic databases and journals. This step identified primary studies through appropriate electronic databases and search of relevant management journals and professional associations’ websites. This search was carried out using the search string shown in Table 1.

Step 5: Review results, refine search strings and re-search databases as needed. This step involved the screening of titles and abstracts of primary studies identified in phase 1 for relevance. This phase was automated to reduce the number of results or hits produced by the search string in phase 1. Automation was possible by searching the titles and abstracts of search results electronically using key terms from the search string or the review question. Emerald Insight - Emerald Fulltext and Management Reviews which produced the highest number of hits, has a search within search results function, which allows the reviewer to electronically search the results of search for relevance based on the keywords identified at the beginning of the search process.

Step 6: Document results and perform quality assessment. Primary studies that were relevant to the research question were recorded in a spreadsheet for full text analysis and quality appraisal using a pre-set list of quality assessment criteria for inclusion.

As can be seen, phases are iterative and are part of the search process as shown in Figure 1.

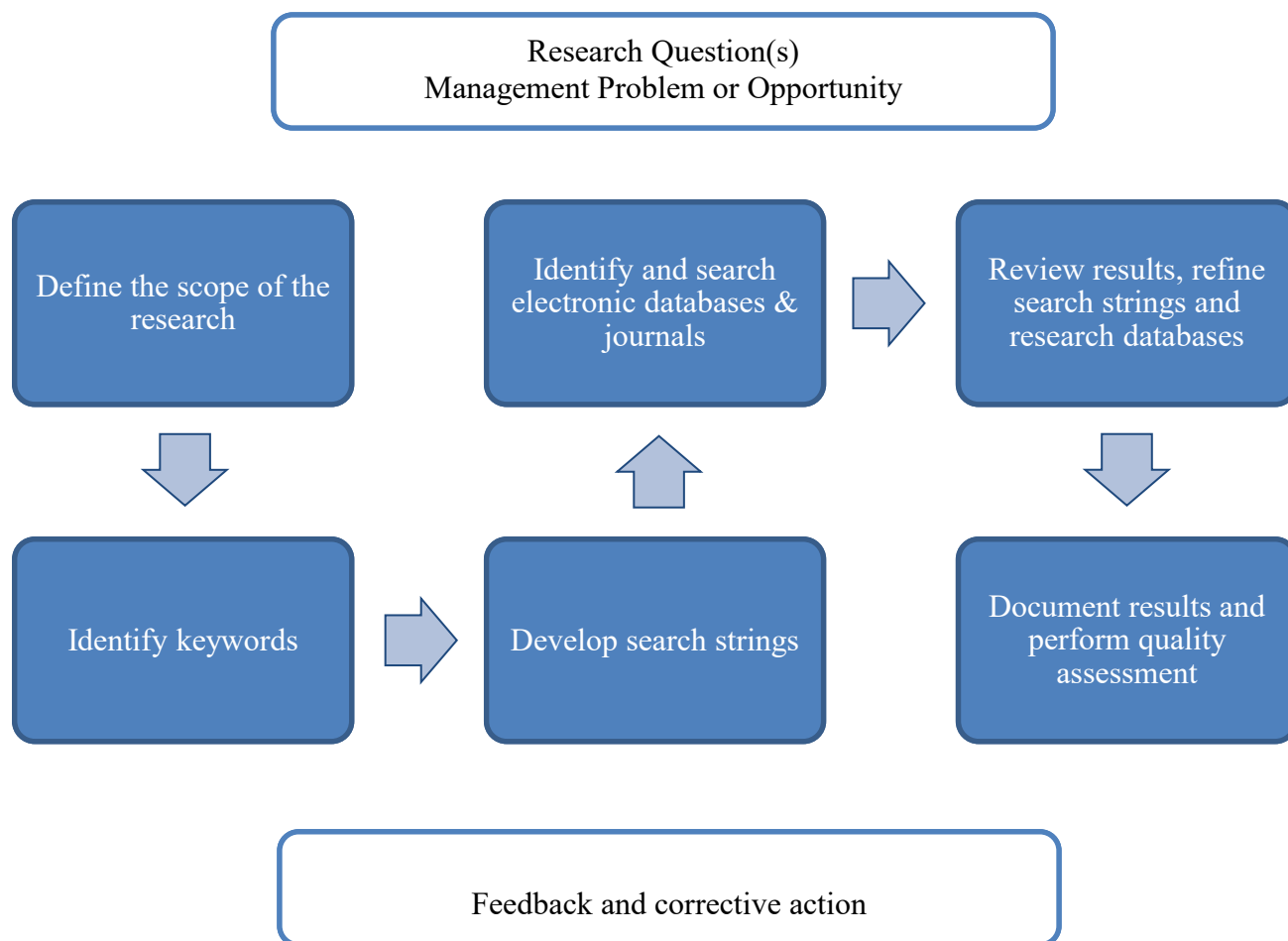


Figure 1. A six-step process for identifying and selecting research studies in systematic reviews. Steps are shown here in sequence, but in practice, they may be iterative.

Quality Assessment of Included Studies

Quality assessment in research synthesis has been a common practice in the field of medicine for the last three decades (Gough, Oliver, & Thomas, 2012). As a consequence, many tools have been developed for appraising the quality of primary studies which serve as inputs for systematic reviews (Denyer & Tranfield, 2009). Such tools include the HoE (hierarchy of evidence) framework (Canadian Task Force on the Periodic Health Examination, 1979); the TAPUPAS (transparency, accuracy, purposivity, utility, propriety, accessibility, specificity) framework (Pawson, Boaz, Grayson, Long, & Barnes, 2003); and the WoE (weight of evidence) framework (Gough, 2007). However, Petticrew and Roberts (2006)

pointed out that most of these tools, developed in the medical field for assessing the effectiveness of interventions, are difficult to apply in the social sciences (p. 57). A major constraint in that regard is the lack of consensus in management research (Barends, ten Have, Huisman, 2012) and practice (Tranfield, Denyer, & Smart, 2009). Similarly, Gough (2007) argued that reviewers must decide whether their quality assessment will be generic or specific to the review question. The point is that the nature of the review question, the context of the study, and the level of heterogeneity of available evidence play a significant role in selecting a quality assessment tool (Gough et al., 2012).

This review takes a fit for purpose approach (Boaz & Ashby, 2003) to assessing the quality of evidence and integrates both qualitative and quan-

titative primary studies in the review process. This quality assessment approach recognizes the value of qualitative research in the management field and takes a broader perspective into consideration (Thomas & Harden, 2008). Primary research studies are appraised using a scheme developed by Pittaway, Robertson, Munir, Denyer, & Neely (2004). Studies are assessed on a scale of 0 to 3, 0 being absent and 3 being high. Not applicable (N/A) was used to indicate when a criterion could not be applied to the study being evaluated (see Appendix B). Criteria for quantitative studies include theory robustness, implication for practice, (methodology, data and supporting arguments), generalizability/transferability, and contribution to theory and/or practice. For assessing the quality of qualitative primary studies, the quality assessment scheme was adapted to replace the concept of gen-

eralizability with transferability. Generalizability or external validity is an epistemic concept associated with positivism. Positivists hold the belief that their research findings and/or conclusions can be inferred to the broader population; that is, the findings are valid in other contexts and may be applied to other people or groups of people. Although qualitative researchers sometimes believe that their findings are generalizable (Patton, 2014), many argue that generalization is not a major goal of qualitative research (Pyrzczak, 2008; Trochim, Donnelly, & Arora, 2016). Evaluating qualitative research studies with the same criteria used for quantitative research may create a systematic bias in the research synthesis (Gough, Oliver, & Thomas, 2012). Table 2 shows an example of the quality assessment process.

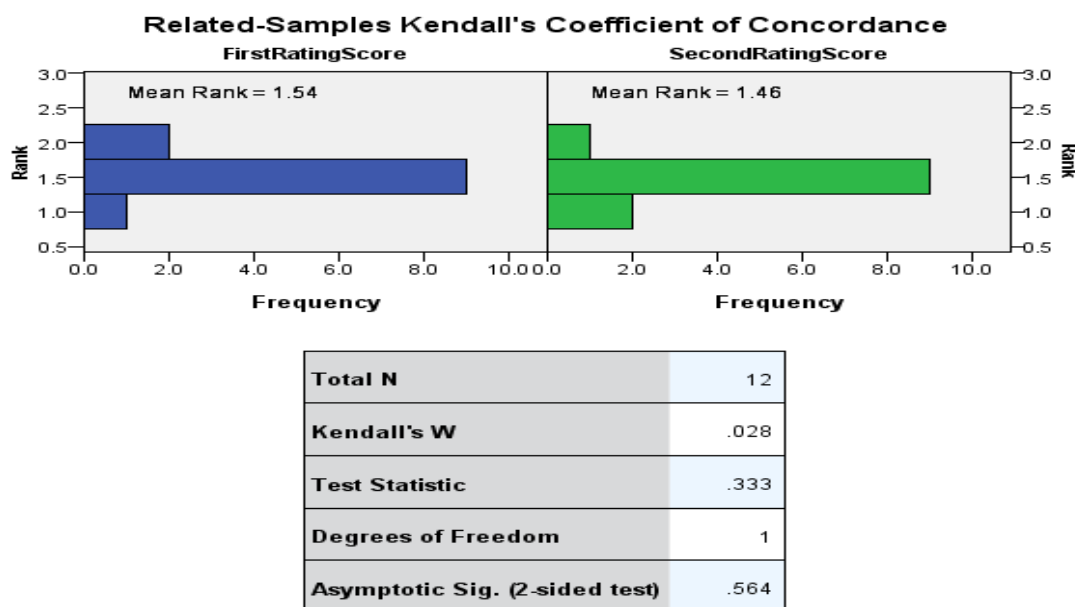
Quality Assessment of Primary Studies on a Scale of 0 to 3					
Primary Study	Ahmad, M.A., Mohd Norhasni, A., Rozaizah, S., Rosman, I., & Mohd Kamalir Irwan Abdul, R. (2016). Mediating Effect of Sustainable Product Development on Relationship between Quality Management Practices and Organizational Performance: Empirical Study of Malaysian Automotive Industry. AIP Conference Proceedings, 1761 (1) 020010-1-020010-6. doi: 10.1063/1.4960850				
Method	Randomly selected and surveyed 91 small and medium size automotive vendors in Malaysia				
Quality Assessment Criteria					
Element	Level				
	0 Absence	1 Low	2 Medium	3 High	Not applicable
1. Theory robustness				2	
2. Implication for practice					3
3. Methodology, data and supporting arguments					3
4. Generalizability				2	
5. Summary of contribution to theory & Practice					3
Average quality score					2,6

Note: Each study was assessed based on the criteria shown in this table. Studies that scored less than 1 on a scale of 0 to 3 were automatically excluded. Quality assessment instrument adapted from “Networking and Innovation: a Systematic Review of the Evidence” by L. Pittaway, M. Robertson, K. Munir, D. Denyer, & A. Neely, 2004, International Journal of Management Reviews, 5/6, p.168. Copyright 2004 by International Journal of Management Reviews.

The full text of 13 of the primary studies was read and assessed for quality according to the pre-set criteria shown in Table 2. At this stage, 1 study scored 0.90 on a scale of 0 to 3 and was excluded due to a lack of theoretical robustness and the fact that the method used to collect the data

was unclear. To ensure the validity of the quality assessment process, the reviewer performed a quality assessment and a quality re-assessment of the 12 primary studies included in this review within a 5-day elapsed time interval.

As shown in Figure 2, a Kendall’s coefficient of concordance was performed to evaluate whether the reviewer’s quality assessment judgment was consistent over time. There was no evidence to suggest that there was a significant difference between the mean ranks (Kendall’s $w = .028$, $p = .564$) of the first and the second rating. Follow-up pairwise comparison was not conducted as the null hypothesis could not be rejected (Burns & Burns, 2008).



1. Multiple comparisons are not performed because the overall test retained the null hypothesis of no differences.

Figure 2. IBM SPSS version 24 output of the Kendall’s Coefficient of Concordance. The null hypothesis states that there is no difference between the first rating score and the second rating score (Burns & Burns, 2008). There was no sufficient evidence to reject the null hypothesis.

Data Extraction and Analysis

Thematic data analysis was used to integrate the findings of the primary studies of various types (e.g., qualitative, quantitative, and mixed-method

studies) by identifying and coding key themes that emerged during the analysis (Thomas & Harden, 2008). Thematic data analysis includes three overlapping stages: 1) line-by-line coding of the findings of primary studies; 2) organization of free-

codes into related areas to construct descriptive themes; and 3) the generation of analytical themes (Thomas & Harden, 2008, p. 4). The thematic data analysis process is shown in Figure D1 in Appendix D.

Thematic data analysis is the most appropriate qualitative data analysis technique when the aim of the review is the configuration of the primary data into a cohesive whole (Gough, Oliver, & Thomas, 2012; Thomas & Harden, 2008), and when the reviewer is dealing with a small number of primary studies (Gough et al., 2012). These features accurately represent the condition of this study. Analytic coding was utilized to translate the content of the primary studies into a framework that went beyond each primary study (Rousseau,

2012). In this study, the reviewer took an inductive approach to data analysis (Charmaz, 2011; Denzin & Lincoln, 2011).

Primary studies were imported into the Atlas.ti 7.5 software package. This software package facilitated the coding process and triangulation of data sources. Data triangulation and constant comparison of data sources are necessary steps in qualitative data analysis (Corbin & Strauss, 2016; Miles, Huberman, & Saldana, 2013; Saldana, 2016). Using multiple data sources to compare and contrast findings has the potential to increase qualitative research validity (Elliot, 2007; Johnson, 1997).

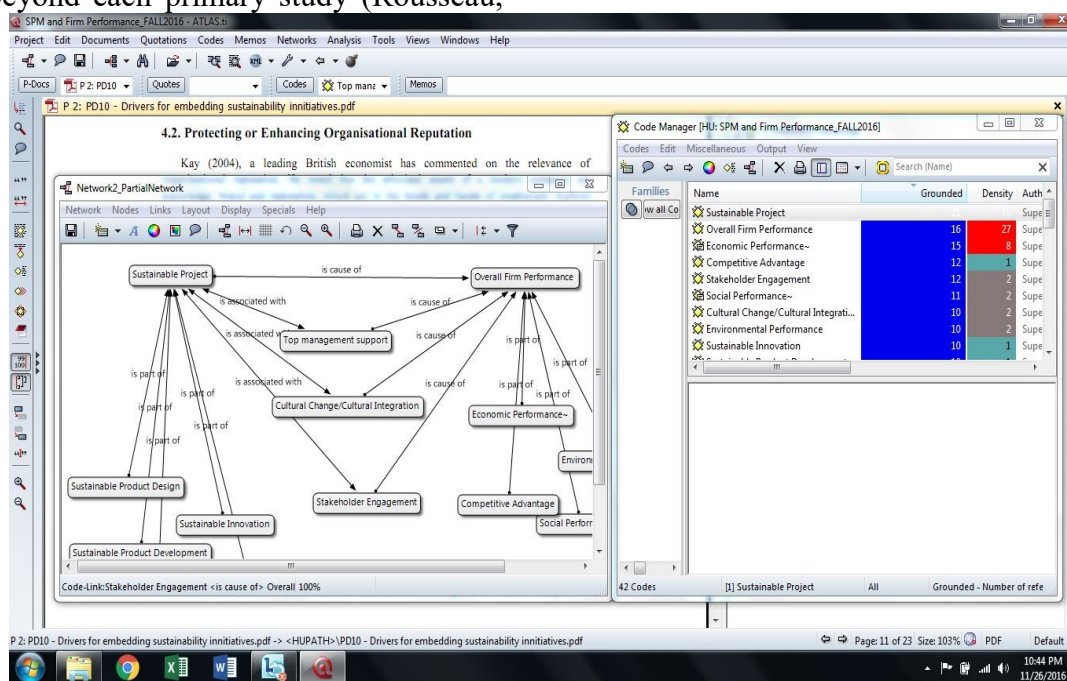


Figure 3. Screenshot of a partial network of the theoretical framework of the relationship between sustainable project management (SPM) and firm performance. Output generated from Atlas.ti version 7.5. This partial network shows that SPM positively affects firm performance. However, top management commitment and stakeholder engagement were found to be necessary conditions; and a cultural change is often necessary. The period covered in study was 2009-2016.

Synthesis of the Evidence

This systematic review was conducted according to generally accepted processes for conducting systematic reviews in social sciences (Petticrew & Roberts, 2006; Rousseau, 2012; Tranfield, Denyer,

& Smart, 2003). A review protocol was first developed, and then the review was conducted according to the processes, tools, and techniques identified and adopted in the protocol, also known as the review methodology (Center for Review and Dissemination, 2009). The review explored

the relationship between sustainable project management (SPM) practices and firm performance in organizational context. As suggested by Gough, Oliver, and Thomas (2012), the data analysis process started by categorizing important variables and characteristics of the data, and then the reviewer quickly switched from categorization and description of the data to analytic coding as shown in Figure 3 (see Thomas & Harden, 2008). 35 researchers in 12 countries conducted the primary studies. Data were collected over a 7-year period in 20 countries, including Australia, Canada, France, Germany, Spain, the United Kingdom and the United States. A full list of all 20 countries can be found in Appendix C.

The results of this review shows that sustainable project management practices have global

interest, with studies and practices across continents. Primary studies were performed in Australia (1), Brazil (1), Malaysia (1), China (1), Hungary (1), Malaysia and New Zealand (1), Slovenia, Sweden, and UAE (2), United Kingdom (2), and United States (2). The evidence indicates that most of the studies are being conducted in Europe (41.67%) and the United States (16.67%). Africa was unfortunately not represented in the sample. It would be enlightening to know and understand what is happening in Africa in terms of sustainable project management practices. This could be part of the agenda for future research.

Table 3 shows the list of industry sectors covered in the primary studies. The percent column indicates the percentage of the total studies that covered a particular industry sector.

Table 3
List of industry sector covered in the primary studies

Industry	# of Study	Percent
Agriculture, Forestry, Fishing and Hunting	1	8%
Accommodation and Food Services	2	17%
Construction	7	58%
Finance and Insurance	2	17%
Health Care and Social Assistance	1	8%
Information Technology and Communication	3	25%
Manufacturing(automotive & pharmaceutical)	5	42%
Mining, Quarrying, and Oil and Gas Extraction	1	8%
Professional, Scientific, and Technical Services	1	8%
Real Estate and Rental and Leasing	2	17%
Retail Trade	1	8%
Utilities & EPG	3	25%
Transportation and Warehousing	2	17%
Whole Sale Trade	1	8%

It is important to note that industry coverage overlapped. For example, Renukappa et al. (2013) analyzed energy & utilities, transportation, and construction. More than 50% of the studies covered the construction industry. Other popular industries among the studies included manufacturing (42%), followed by information technology and communication (25%) and utilities and electric power generation (EPG). Accommodation and food services, finance and insurance, and real estate, rental, and leasing were tied at 17%. A surprising finding in this review was that the healthcare and social assistance industry sector

was not heavily represented in the sample. Only 1 study covered sustainable project management practices in the healthcare industry. Further investigation is needed to understand whether this lack of research is a significant gap between research and practice in this industry.

Analysis of the Relationship

The data analysis revealed that there is a relationship between sustainable project management practice and firm performance (see Figure 4). For example, Maletic et al. (2016a, 216b) sur-

veyed 266 organizations across firm size in Germany, Poland, Serbia, Slovenia, and Spain in the manufacturing and service industries. They found that sustainability-oriented innovation project management practices are significantly and positively related with overall firm performance (p. 1182). Performance measures encompassed economic performance, quality performance, innovation performance, environmental performance and social performance (p. 1176). Similarly, Eilers et al. (2016), Renard et al. (2013), Renukappa et al. (2013), and Tan et al. (2011) reported positive and

significant relationship between sustainable construction project management practice and organizational performance. However, in a case study involving two real estate developers in the United Kingdom (p. 98), Bryson and Lombardi (2009) found that project management sustainability practices restrict firm profitability in the short-term (p. 104). Based on the thematic data analysis and data triangulation of all 12 primary studies, a project management sustainability practice has been theorized as shown in Figure 4.

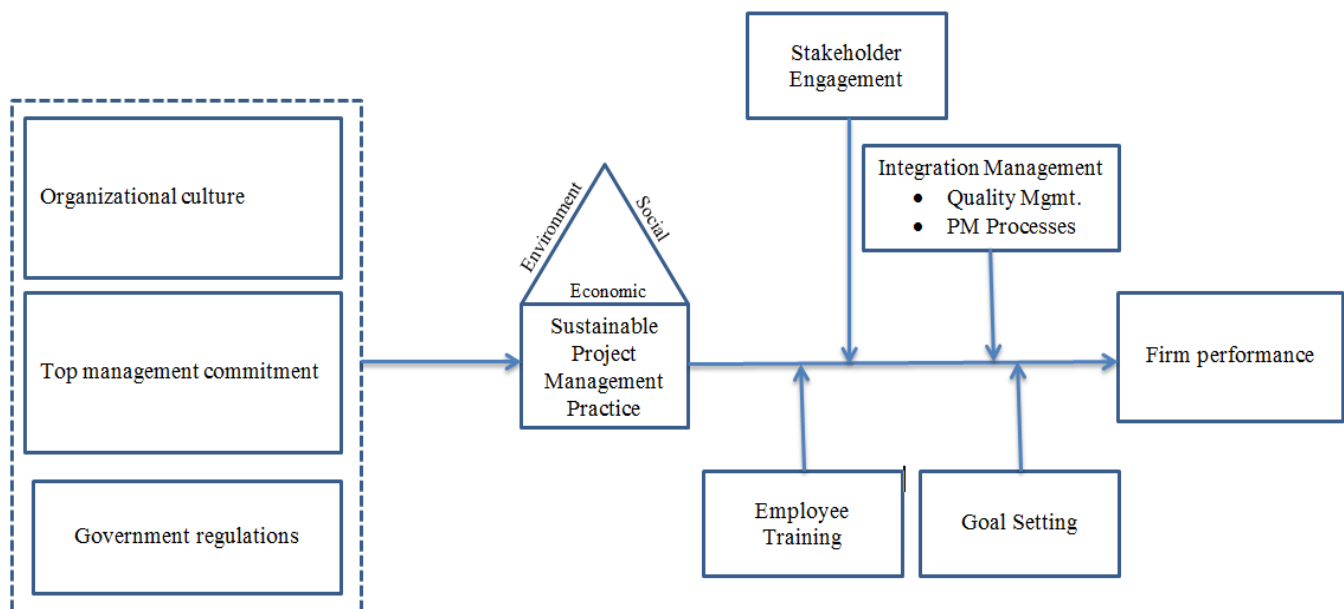


Figure 4. Theoretical framework of SPM practices and firm performance.

The framework proposes that organizational culture (Ameer & Othman, 2011; Bryson & Lombardi, 2009; Maletic et al., 2016a, 2016b), top management commitment/support (de Jesus Lameira et al., 2013; Renukappa et al., 2013; Weidner, 2012), and government regulations (Renukappa et al., 2013) are antecedent variables of the apparent relationship between sustainable project management practices and overall firm performance. Although government regulations are not always present, they are often anticipated and can influence SPM practices to some extent. The results of the review indicated that firms engaged

in SPM practices can expect to gain a long-term competitive advantage (Ahmad et al., 2016; Bryson & Lombardi, 2009; Eilers et al., 2016; Maletic et al., 2016) in terms of innovation or future opportunities. Employee training (Bryson & Lombardi, 2009; Maletic et al., 2016), clear goal-setting (Maletic et al., 2016; Renukappa et al., 2013), integration management (Ahmad et al., 2016; Maletic et al., 2016), and stakeholder engagement (Maletic et al. 2016; Renukappa et al., 2013; Weidner, 2012) were found to influence the relationship between sustainable project management practices and firm performance. Future pri-

many research studies may hypothesize that these variables moderate the relationship between SPM practices and overall firm performance.

Performance measures

A variety of metrics was used to measure firm performance as shown in Table 4. After compiling and analyzing these metrics, the reviewer noted that these measures may be categorized according to the balanced scorecard approach to firm

performance measurement (Kaplan & Norton, 2007) and the sustainability balanced scorecard approach (Figge, et. al., 2002; Möller, & Schaltegger, 2005; Hansen, & Schaltegger; 2016). Table 4 shows a list of all variables used across studies to measure firm performance, categorized into three perspectives, namely, financial, quality, and stakeholder performance. The percent column indicates the percentage of studies that reported a specific metric. Metrics coverage overlapped among studies; that is, one study may have reported more than one metric.

Financial Performance	Percent of studies
• Long-term profitability	50%
• Improved return on assets	25%
• Improved cash flow from operating activities	17%
• Reduced operating cost	17%
• Sustained revenues from sales	8%
• Higher earnings quality	17%
Quality Performance	
• Improved innovation and creativity	42%
• Increased efficiency	17%
• Reduced failure cost	0%
• Reduced waste	17%
Stakeholder Performance	
• Internal Stakeholders	
○ Improved employee satisfaction	8%
○ Improved employee morale	42%
○ Improved employee retention	50%
• External stakeholders	
○ Improved customer satisfaction	42%
○ Improved customer retention	33%
○ Improved company image	17%
○ Improved social performance	58%
○ Improved environmental performance	50%

Note: Performance measurement metrics found across studies include financial, quality, and stakeholder performance. Stakeholders were divided into internal and external stakeholders.

Study Limitations

This study has several limitations, which pave the way for future research on sustainable project management. This systematic review is based on a set of primary research studies which

served as data for integrating and configuring a collective body of evidence on the relationship between sustainable project management and firm performance. As one may imagine, the quality of these primary studies cannot be fully ascertained as not all data involved in the primary studies were

made available by the primary researchers. This limitation stems from the fact that publishers provide only so much space to researchers in terms of what they can and cannot make available to consumers of research. A second limitation was that the study was conducted under time and scope constraints, which may have influenced the quantity of the data included in the review. In other words, the number of primary studies and research reports included may not have been exhaustive. However, this study may serve as a starting point for an understanding of the body of evidence on the value (economic, social, and environmental) of sustainable project management practices in organizations.

Conclusion and Implications for Research and Practice

This review explored the impact of sustainable project management (SPM) practices on firm performance. Several gaps were identified in the literature. One of the most serious gaps was perhaps the lack of evidence on lessons learned from failures of SPM implementations. Another important gap was a lack of research on the effects of market dynamics on the link between SPM practices and firm performance. So far, research has been focused on the benefits of SPM practices (see Table 4); and all of the studies included in this review reported the long-term benefits of SPM practices. For a better understanding of SPM practices, researchers and practitioners must learn from both success and failure cases of SPM implementations. Future research studies may try to identify the conditions or factors that hinder SPM practices. Furthermore, more studies are needed in the health and social care industry sector to analyze the real impact of SPM practices. The quasi-absence of studies on SPM practices and firm performance in the healthcare sector was surprising.

Integrating project quality management and the organization's project management processes with SPM practices, stakeholder engagement, employee training and clear goal-setting were identified as the mechanisms that activate the relationship between SPM practices and firm performance (see Figure 4). Similarly, top management commitment and support, and organizational culture were found to be pre-conditions or antecedent factors for successful implementation of SPM practices. Government regulations, when framed as opportunities, seem to be an antecedent factor to SPM practice implementation and firm creativity. This framework raises many questions for future research. How strong is the effect of each of these variables on the relationship between SPM practices and firm performance? Can the effects actually be measured? If yes, what are the components of these variables? Do outcomes of SPM differ when implementation is perceived as a compliance requirement?

This review has many implications for management practice. Senior managers who are pursuing SPM practices as a competitive advantage must understand that SPM practice is not a short fix. Its success requires consistency, stakeholder engagement, investment in human capital, clear goal-setting, and long-term support and commitment for SPM. Project management professionals must have a clear understanding of the environment in which they operate. For example, understanding the level of support available in their organizations and knowing where to find this support, Project management professionals must develop standard processes, tools, and techniques for integrating SPM practices into their daily project management practices. However, they must recognize that SPM cannot be a "one-size fits all" project management practice. Integration tools and techniques must be designed and re-designed according to the context and application of the individual project.

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Appendix A

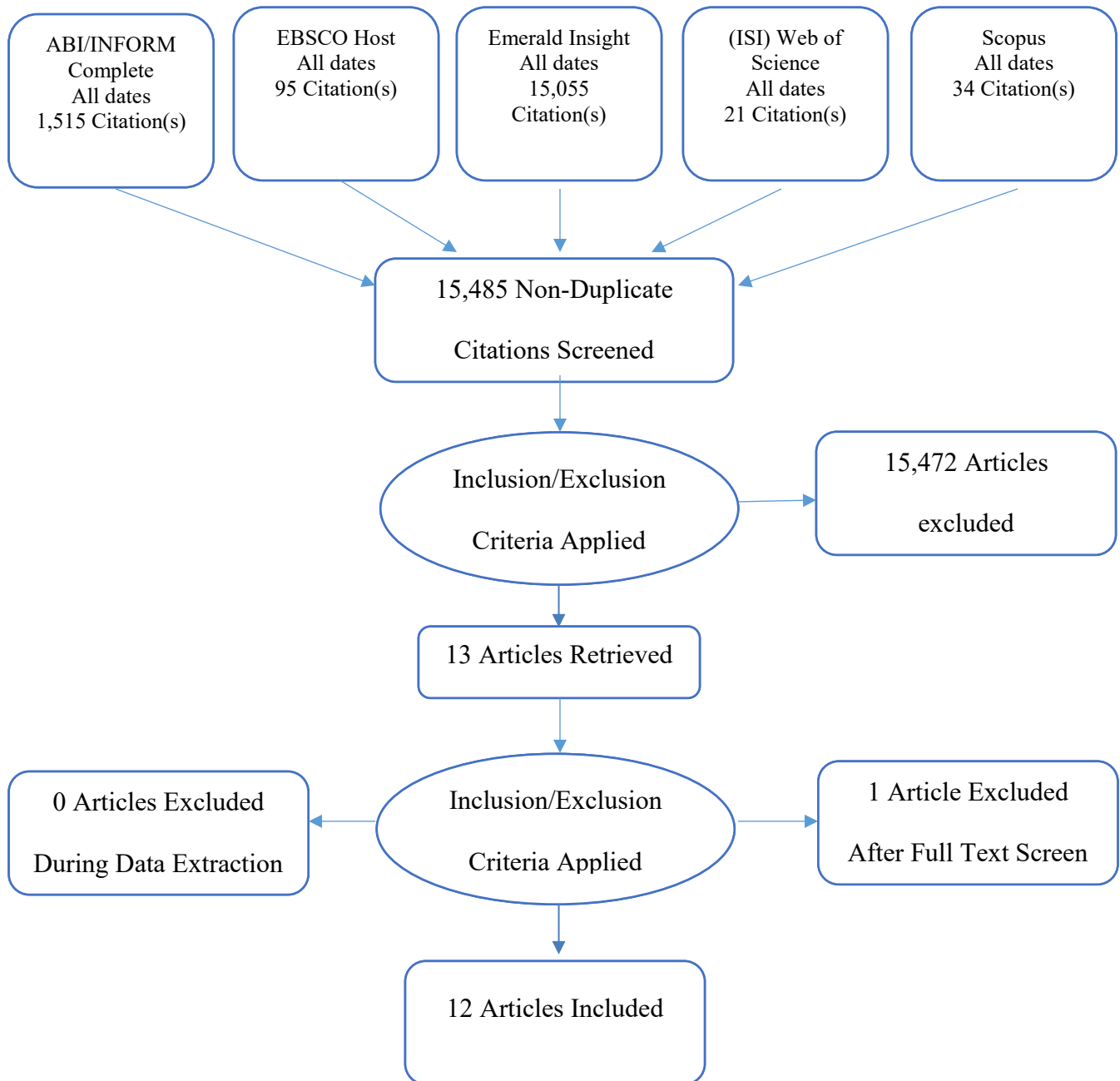


Figure A1. PRISMA diagram for search strategy on SPM and firm performance.

Appendix B

Table B1: Quality Criteria for Quantitative Studies					
<i>Quality assessment criteria</i>					
Element	Level				
	0 Absence	1 Low	2 Medium	3 High	Not applicable
1. Theory robustness	The article does not provide enough information to assess this criterion	Poor awareness of existing literature and debates. Under- or over-referenced. Low validity of theory.	Basic understanding of the issue around the topic being discussed. The theory weakly is related to data.	Deep and broad knowledge of relevant literature and theory relevant for addressing the research. Good relation to theory-data.	This element is not applicable to the document or study.
2. Implication for practice	The article does not provide enough information to assess this criterion	Very difficult to implement the concepts and ideas presented. Not relevant for practitioners or professionals.	There is a potential for implementing the proposed ideas, with minor revisions or adjustments.	Significant benefit may be obtained if the ideas being discussed are put into practice.	This element is not applicable to the document or study.
3. Methodology, data and supporting arguments	The article does not provide enough information to assess this criterion	Data inaccuracy and not related to theory. Flawed research design.	Data are related to the arguments, though there are some gaps. Research design may be improved.	Data strongly supports arguments. Besides, the research design is robust: sampling, data gathering, data analysis is rigorous.	This element is not applicable to the document or study.
4. Generalizability	The article does not provide enough information to assess this criterion	Only the population studied	Generalizable to organizations of similar characteristics	High level of generalizability.	This element is not applicable to the document or study.
5. Summary of contribution to theory & Practice	The article does not provide enough information to assess this criterion	Does not make any important contribution. It is not clear the advances it makes.	Although using others' ideas, builds upon the existing theory.	Further develops existing knowledge, expanding the way the issue was explained so far.	This element is not applicable to the document or study.

Note: Quality Assessment Tool. Adapted from “Networking and Innovation: A Systematic Review of the Evidence” by L. Pittaway, M. Robertson, K. Munir, D. Denyer, & A. Neely, 2004, *International Journal of Management Reviews*, 5/6, p.168. Copyright 2004 by International Journal of Management Reviews.

Table B2: Quality Criteria for Quantitative Studies					
<i>Quality assessment criteria</i>					
Element	Level				
	0 Absence	1 Low	2 Medium	3 High	Not applicable
1. Theory robustness	The article does not provide enough information to assess this criterion	Poor awareness of existing literature and debates. Under- or over-referenced. Low validity of theory.	Basic understanding of the issue around the topic being discussed. The theory weakly is related to data.	Deep and broad knowledge of relevant literature and theory relevant for addressing the research. Good relation to theory-data.	This element is not applicable to the document or study.
2. Implication for practice	The article does not provide enough information to assess this criterion	Very difficult to implement the concepts and ideas presented. Not relevant for practitioners or professionals.	There is a potential for implementing the proposed ideas, with minor revisions or adjustments.	Significant benefit may be obtained if the ideas being discussed are put into practice.	This element is not applicable to the document or study.
3. Methodology, data and supporting arguments	The article does not provide enough information to assess this criterion	Data inaccuracy and not related to theory. Flawed research design.	Data are related to the arguments, though there are some gaps. Research design may be improved.	Data strongly supports arguments. Besides, the research design is robust: sampling, data gathering, data analysis is rigorous.	This element is not applicable to the document or study.
4. Transferability	The article does not provide enough information to assess this criterion	Only the population studied	Transferable to organizations of similar characteristics	High level of transferability.	This element is not applicable to the document or study.
5. Summary of contribution to theory & Practice	The article does not provide enough information to assess this criterion	Does not make any important contribution. It is not clear the advances it makes.	Although using others' ideas, builds upon the existing theory.	Further develops existing knowledge, expanding the way the issue was explained so far.	This element is not applicable to the document or study.

Note: Quality Assessment Tool. Adapted from “Networking and Innovation: a Systematic Review of the Evidence” by L. Pittaway, M. Robertson, K. Munir, D. Denyer, & A. Neely, 2004, *International Journal of Management Reviews*, 5/6, p.168. Copyright 2004 by International Journal of Management Reviews. The word “generalizability” was replaced with transferability.

Appendix C

Table C1

List of data collection sites by alphabetical order.

Australia	Denmark	Japan	Spain
Austria	Finland	The Netherlands	Sweden
Belgium	France	Poland	Switzerland
Brazil	Germany	Serbia	United Kingdom
Canada	Italy	Slovenia	United States

Appendix D

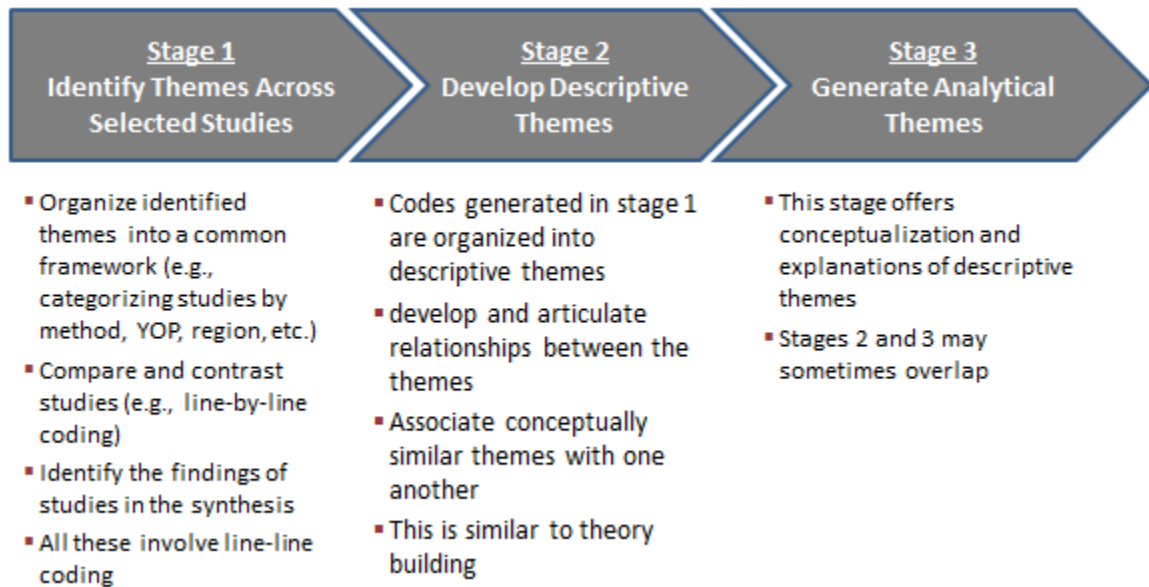


Figure D1: Stages of thematic data analysis. Created from “An Introduction to Systematic Reviews” by D. Gough, S. Oliver, & J. Thomas, 2012, Thousand Oaks, CA: SAGE Publications.

Appendix E

Table E1

List of studies included in this systematic review by alphabetical order

Author	Date	Database	Journal
Ahmad et al.	2016	Academic Search Complete	AIP Conference Proceedings
Ameer et al.	2011	Business Source Complete	Journal of Business Ethics
Bryson et al.	2009	Business Source Complete	Business Strategy & the Environment
de Jesus et al.	2013	Business Source Complete	Revista Brasileira de Gestão de Negócios
Eilers et al.	2016	Emerald Insight	World Journal of Entrepreneurship, Mgmt. & SD
Maletič et al.	2016	Business Source Complete	Total Quality Management & Business Excellence
Maletič et al.	2016	Business Source Complete	Journal of Cleaner Production
Renard et al.	2013	ABI/INFORM	Smart and Sustainable Built Environment
Renukappa et al.	2013	ABI/INFORM	Journal of International Real Estate and CS
Szabó, L.	2016	Academic Search Complete	Budapest Management Review
Tan et al.	2011	Business Source Complete	Habitat International
Weidner, K. L.	2012	ProQuest Dissertations	ProQuest Dissertations Publishing

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