

# Towards excellence in managing the public-sector project cycle: a TQM context

Public-sector  
project cycle

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Carlos F. Gomes

*Centre for Business and Economics Research (CeBER), Faculty of Economics,  
University of Coimbra, Coimbra, Portugal, and*

Michael H. Small and Mahmoud M. Yasin

*Department of Management and Marketing, East Tennessee State University,  
Johnson City, Tennessee, USA*

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## Abstract

**Purpose** – The purpose of this paper is to assess the management of public-sector projects in Portugal paying particular attention to the extent to which total quality management (TQM) principles are being utilized in such projects.

**Design/methodology/approach** – Based on an extensive review of the literature, nine propositions are advanced about the interrelationships among seven factors that were identified, in a previous study, as having some influence on the management process in the planning and implementation of public-sector projects in Portugal. Structural equation modeling was used to investigate these propositions using data obtained from 211 respondents to a survey of project managers from municipalities across Portugal.

**Findings** – The results of the structural equation model indicate that the TQM components working in tandem with project-management-specific variables provide a systematic means of managing the planning and implementation stages of projects, with technical items being critical in the planning stage and softer management items becoming important in the implementation stage.

**Research limitations/implications** – Readers should be careful not to generalize the findings in a global context or for private sector projects. However, researchers are encouraged to extend this study by including other planning and implementation variables with a view to discerning what particular characteristics of a project make it more amenable to TQM solutions.

**Practical implications** – The findings are presented to show how the key components of TQM, customer focus, employee involvement and continuous involvement, can be applied during the planning and implementation stages of projects.

**Originality/value** – The sample size of 211 is representative of the underlying population of project managers in municipalities across Portugal and is comparatively large in relation to other empirical project management studies from Portugal, lending credence to the generalizability of these finding to public-sector projects in Portugal.

**Keywords** Public sector, Total quality management, Project implementation, Attitudes and roles, Project manager skills, Project planning

**Paper type** Research paper

## 1. Introduction

Globally, the public sector is facing the reality of operating in mainly stable or declining economies, with ever shrinking resources, amidst increasing demands from internal and external constituencies for greater accountability for the usage of the funds entrusted to them by the public. Since the early 1980s calls for reforming the public sector, later referred to as “the New Public Management” (NPM) have been taking hold (Brunetto and Farr-Wharton, 2003; Hood, 1991; Lawton, 2005; Wisniewski and Olafsson, 2004). These reforms were, and still are, being motivated by efforts to make government less wasteful, more efficient and more responsive to the needs of its various constituencies. However, effective transformation of the public sector and its projects, from a closed-system bureaucratic orientation, to a more open-system orientation has not been without challenges that are mostly concerned with dislodging bureaucratic inertia. Indeed, many successes in



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government reform have been achieved by those departments and agencies that have been able to adapt to a more open-systems operational approach powered by a business-oriented outlook, rather than a pedantic bureaucratic philosophy.

Advances in public-sector reform have often been achieved by using directly, or adapting, methods and philosophies such as total quality management (TQM) that have previously been tried and tested primarily in the armed forces (United States Department of Defense, 1989) and organizations in the private sector. TQM is defined in different ways by different people and different organizations such as British Standards Institution, International Organization for Standardization (ISO) and the Chartered Quality Institute. However, an overarching theme in most definitions is that TQM can be considered as either a philosophy or a set of guiding principles that can be used by organizations to address the attainment of quality from a strategic perspective. TQM provides a means of continuously improving an organization with the ultimate aim of allowing the organization to meet stakeholder needs efficiently and effectively.

In practice, TQM is an organization-wide effort that focuses on the aspects of quality that lead to customer satisfaction and involves members at all levels of the organization in moving toward the quest of achieving organizational and ultimately societal success (Pfeifer, 2002). TQM emphasizes customer orientation, employee involvement and continuous improvement; three objectives that are consistent with improving the efficiency and effectiveness in the management of all activities at all stages of public-sector projects (Scharitzer and Korunka, 2000). Therefore, the aims of TQM are consistent with meeting the needs enunciated by the NPM. As such, it can be argued that usage of the TQM philosophy has the potential to improve the management of public-sector projects and, in the process, of enhancing the ability of government to meet the needs of its respective constituencies and stakeholders and to answer the growing calls for greater public accountability.

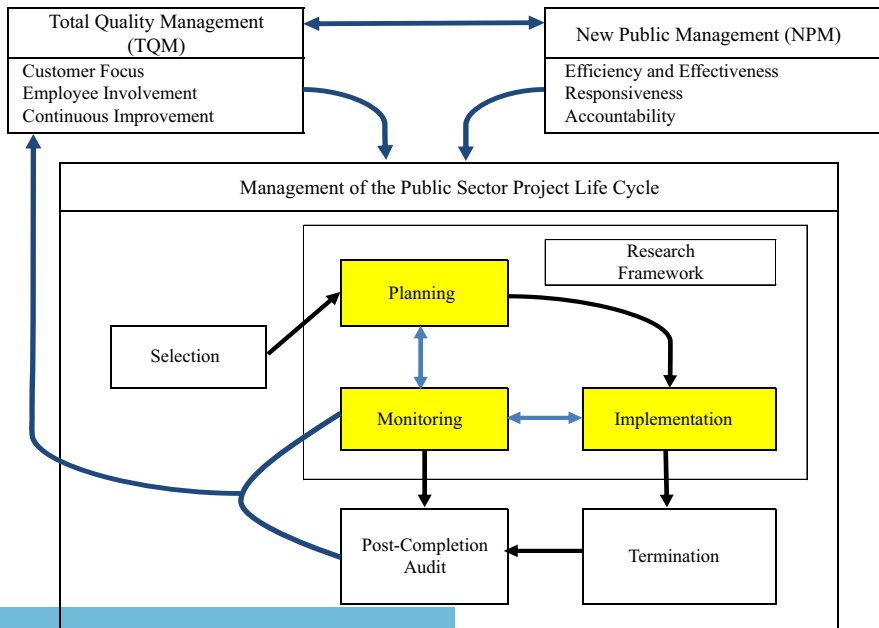
With specific reference to Portugal, during the past decade there have been structural problems in the economy that have contributed to a wide range of domestic economic problems resulting in excessive debt levels and increasing public deficits. The Portuguese National Government has sought to stem the tide of economic decline by instituting structural adjustments aimed at stimulating the economy and improving the management of public finances. Efforts are being made to reduce the size of the public sector and to improve efficiency and effectiveness in the delivery of government goods and services. This places significant pressure on government agencies and departments to improve the management of their projects. Research that is focused on discovering best practices in public-sector project management in Portugal will be beneficial to project managers as they seek to maximize returns from the scarce resources available for such ventures. It should also be noted that in Portugal, state and municipal agencies have sponsored intensive training programs in TQM, continuous improvement, strategy, performance measurement and project management for public-sector officials and staff as a means of inspiring and promoting more business-like operations in government agencies and state-owned enterprises.

Wirick (2009) reported that issues dealing with public-sector project management are among the least researched within the project management area. Moreover, finding that there is a lack of research on TQM in project environments, Bryde and Robinson (2007) suggested that there is a need for further systematic research into the potential relationship between TQM and project implementation and performance. In the few private sector studies that have been carried out, there have been mixed findings about the relationship between the adoption of TQM and other quality management practices, and project implementation and performance (see e.g. Shieh and Wu, 2002; Tukel and Rom, 2001).

In responding to the needs outlined above, this research seeks to help fill the void in the project management literature by assessing the management of public-sector projects in Portugal. It also seeks to determine to what extent TQM principles are being used directly or indirectly in public-sector projects. Issues concerning the interrelationships among seven public-sector project management constructs derived in a previous Portuguese public-sector study by Gomes *et al.* (2012) are investigated using the same research instrument. This current study attempts to replicate and update the findings of that study which was based on a survey of 102 public-sector project managers which revealed that they were using different subsets of their knowledge and skills to influence outcomes at the planning and implementation stages of projects. This study examines the results of a follow-up survey of 211 public-sector managers. The current study was administered one year after the European Sovereign debt crisis which precipitated structural adjustments in the Portuguese economy accompanied by significant public-sector reforms.

The research propositions that were posed in the Gomes *et al.* (2012) paper and were found to be significantly supported by their data are also used as propositions for this study. Given that this research requires testing of interactions among a variety of constructs, a structural equation modeling (SEM) approach is utilized to analyze data obtained from a sample of 211 Portuguese public officials with public-sector project management experience. In discussing the implications of our findings, this paper will discuss the extent to which it replicates the Gomes *et al.* (2012) paper. It will also attempt to outline areas where TQM principles and practices are being used and areas where they may be used more effectively to enhance the management of public-sector projects.

The organizing framework for this research is presented in Figure 1. The figure proposes that TQM and NPM, working together, can have a direct and positive impact on the management and outcomes of public-sector projects. While NPM should provide the rationale for improved efficiency, effectiveness, accountability and responsiveness, the principles of TQM – customer focus, employee involvement, and continuous improvement, working in



**Figure 1.** Organizing framework for the research study

tandem with established project management practices – provide the philosophy, the process and the tools that can be used to effect the needed changes in the management of public-sector projects. In this regard, viewing the monitoring and assessment of project quality as necessary throughout the entire project cycle means that each stage may be able to benefit from the application of TQM principles and tools. Ultimately, the lessons learned from continuous project monitoring and the project post-completion audit can be used to improve the utilization and implementation of TQM in future projects.

This paper contributes to the project management literature in a variety of ways. It attempts to replicate previous project management results from the Portuguese public sector. It also seeks to extend the coverage of public-sector project management in the literature by investigating interrelationships among activities in the early stages of the project life cycle from a TQM perspective. This is an important area of project management practice where empirical research has been lacking. As such, we perceive our contribution in this area to be one of proposing a practical model that can be subjected to adaptations and empirical testing in the future. The paper also presents several practical implications from the findings of the research, and advances several recommendations for the more effective management of public-sector projects and for the utilization of TQM principles and practices in project management in the Portuguese public sector.

## 2. Background

Increasingly, organizations in the public sector are utilizing projects to meet their structural and infrastructural development obligations. Not unlike their manufacturing- and service-oriented counterparts, public-sector organizations are using projects to develop and improve their core competencies and practices. However, because the external environment plays an important role in dictating resources, policies and modes of operation of public-sector organizations, they tend to be more heavily influenced by external factors than private sector organizations. In most cases, the selection, funding and execution of public-sector projects are also subject to closer scrutiny by external stakeholders, which can include politicians, political watch groups and other interested members of the general public (Brunetto and Farr-Wharton, 2003; Khang and Moe, 2009).

Concerning internal factors, the recent trend toward downsizing, rightsizing or reinventing government organizations and departments in combination with depressed economic activity and government budget deficits has increased the internal pressure on public-sector project managers to make more effective use of their scarce project resources (Kamarck, 2007). One response to the adverse internal and external factors faced by public-sector projects has been an increase in the usage of public/private partnerships to help fund and initiate desirable structural and infrastructural development projects that the public sector may be unable to finance.

Projects are endeavors that have a limited life span and are, therefore, conducive to description in terms of a life-cycle process (Gransberg and Ellicott, 1997; Lavagnon, 2009; Ng and Walker, 2008; Pinto and Slevin, 1988). There is general recognition that as a project moves through its various stages the project manager and senior management will need to refocus their attention, energy and resources to address the critical requirements of the new stage (Jiang and Heiser, 2004). Hence, project managers may be expected to display a changing variety of leadership and management skills to guide the project through its various stages (Jha and Iyer, 2006; Verma, 1996).

Project managers in the public sector may also have to deal with more constraints relative to their counterparts in the private sector. For example, public-sector projects often involve collaborations between government, the private sector, other quasi-governmental agencies and national or international funding agencies and organizations each with their own peculiar objectives which may sometimes be conflicting (Torres and Pina, 2004).

Furthermore, public-sector projects may be complicated by the need to deal with internal issues such as entrenched bureaucracies and non-responsive employees. In addition, management of development projects has been viewed as an inherently political process that is concerned with processes of persuasion and the ability to effectively manage relationships among the various project partners (Heeks and Stanforth, 2014). In particular, projects in transitional political economies (such as Portugal) appear to be more heavily influenced by politics (Struyk, 2007). External constraints may include dealing with disgruntled or otherwise concerned citizens and stakeholders, and non-traditional operating constraints (Brown, 2001; Carton and Ache, 2017; Ward and Mitchell, 2004). Thus, managing projects in public-sector environments often pose more serious challenges than managing equivalent projects in private sector environments.

It would be expected that given the multifaceted nature of the issues surrounding public-sector projects noted above, there would be volumes of research studies on projects in the public sector. But this has not been the case. In fact, it has been reported that issues surrounding public-sector project management are the least researched areas within project management (Wirick, 2009). Moreover, there is a dearth of coverage of the relationship between TQM implementation in project management (Bryde and Robinson, 2007), especially within the public sector. Our review of the literature concerning the link between project management, public management and TQM indicates that .... This study seeks to contribute to research output in this area by building on the knowledge about the project management process for public-sector projects during the planning and implementation stages with specific reference to the potential utilization of TQM approaches.

The underlying life-cycle model approach to be used in this study consists of the selection, planning, implementation and completion/termination stages. However, our study will focus on the planning and implementation stages because many public-sector project managers are assigned to a project only after the project has been selected. Such project managers will only be directly involved with the project starting at the planning stage, however, they still bear the responsibility of becoming aware of the deliberations and actions taken during the selection stage.

Historically, the effectiveness of project implementation and performance in both private and public-sector projects has been gauged using three metrics: time, cost and quality. With regard to quality, the measure of quality most utilized in assessing projects is likely to be related to "fitness for purpose" or "quality of workmanship," implying a focus on quality assurance rather than quality management (Walker and Keniger, 2002). These authors also indicate that some quality management systems such as ISO 9000 and ISO 14000 reflect a greater concern with evaluating processes than with defining and assessing the achievement of quality itself. Some suggest that more comprehensive, stakeholder-focused definitions and assessments of quality throughout the project life cycle can better be achieved by utilizing TQM. The TQM philosophy focuses on quality throughout all stages of the project life cycle and requires all members of the organization – management, supervision and staff as well as external partners to be intricately involved in the process (Bryde and Robinson, 2007; Orwig and Brennan, 2000; Shieh and Wu, 2002; Walker and Keniger, 2002).

As indicated earlier, the bulk of the research and the literature on the application of TQM in project management has focused on private sector projects. The coverage of topics in this area has been diverse: from examination of the use of projects to adopt TQM (Hides *et al.*, 2000) to the actual use of quality management tools in project management (Barad and Raz, 2000; Lau and Tang, 2009). Other research suggests that an integrated view of project and quality management can lead to improved processes and performance in organizations (Orwig and Brennan, 2000). In this regard, Orwig and Brennan (2000) viewed project management and TQM to be synonymous in project dominated firms. As an application of

the use of TQM in public-sector projects, Holt and Rowe (2000) examined the relationships among total quality, public management and critical leadership, finding that the application of TQM informs and improves project sponsor leadership throughout the various stages of the project.

This research focuses on project management practices among municipal branches of government in Portugal by surveying a sample of project managers drawn from each of the main administrative regions in Portugal. Much of the previous research on public-sector projects in Portugal has focused on case studies of individual projects or comparisons of a limited number of projects (Brinkerhoff and Ingle, 1985; Golabi and Pereira, 2003; de Lemos *et al.*, 2004).

Gomes *et al.* (2012) identified seven factors that influence the project management process in the planning and implementation stages of public-sector projects: Public Policy Internal/External Interface Knowledge; organizational knowledge; technical knowledge; project management knowledge; project manager behavioral skills and attitudes; project manager roles; and project implementation monitoring. A brief explanation of the variables that contribute to each of these factors and the literature citations that attest to the importance of these variables for each factor and for project management, in general, are outlined in Table I.

The constructs used in the Gomes *et al.* (2012) study are of particular relevance to this study because many of the variables contained in these constructs may be viewed as contributors to improving customer focus, employee involvement, accountability, efficiency and effectiveness, and responsiveness and in enabling continuous improvements in the public sector – key components of TQM and NPM. This is not surprising because the federal and local governments in Portugal have emphasized training in philosophies and practices such as TQM and continuous improvement and have sponsored professional training programs for public-sector project managers as they seek to transform the public sector into leaner, more effective departments and agencies. Therefore, it appears that administrators and executives in the public sector will be receptive to the applications of TQM and other management philosophies to improve the management and subsequently improve the performance of public-sector projects.

Along with responding to calls in the literature for more research on public-sector project management, this research is motivated by the practical relevance of enhancing the effectiveness of the management of the planning and implementation components of the public-sector project cycle. It will address proposed linkages between the various constructs representing the knowledge, competencies and roles of project managers in the planning and implementation of public-sector projects that are outlined in Table I. The following nine propositions about the interrelationships among these constructs that were tested and supported in the Gomes *et al.* (2012) study will also be used as propositions for this paper:

- P1. Knowledge of the public policy internal/external interface enhances organizational knowledge.
- P2. Knowledge of the public policy internal/external interface will enhance technical knowledge.
- P3. Project-related technical knowledge enhances organizational knowledge.
- P4. Technical knowledge will enhance project management knowledge.
- P5. Organizational knowledge will enhance project management knowledge.
- P6. Project management knowledge will influence the project manager's behavioral skills and attitudes.



Project management construct	Supporting literature
<p>Public policy interface</p> <p>Public-sector project managers need to understand the unique relationship between internal and external politics and how top executive decision making may be shaped or influenced by this relationship. This requires the project manager to have a workable knowledge of, or, skills and experience in the following three areas concerning the public policy interface (a) external politics (b) internal politics and (c) executive decision making</p>	<p>Dilts and Pence (2006), McPhee (2008), Meyer (2000), Arlbjorn <i>et al.</i> (2015), Torres and Pina (2004), Williams and O'Leary (2008)</p>
<p>Organizational knowledge</p> <p>Project managers must be cognizant of the organizational politics and policies and possess the communication and negotiation skills required to advocate for the allocation of the required project resources from top executives. This requires the project manager to have a workable knowledge of, or skills and experience in, the following four areas: (d) organizational skills (e) organization policies (f) leadership ability and (g) obtaining and effectively utilizing top executive support</p>	<p>Baca (2007), Beagrie (2004), Bourne and Walker (2004), Creasey and Hiatt (2008), Hall <i>et al.</i> (2003), Neuhauser (2007), Van Ingen (2008), Zwikael (2008)</p>
<p>Technical knowledge</p> <p>Project managers must be cognizant of the technical codes, standards and environmental regulations under which the project will operate. This requires the project manager to have good knowledge of or skills and experience in the following three areas: (h) project management standards or codes (i) technical requirements and (j) environmental regulations</p>	<p>Baram (1992), Cora (2009), Crawford and Pollack (2007), Crawford (2005), Eligator (2008), Marshall (1992), PMBOK Guide (2013), Salimi (2009), Shaw (2005), Slivka (1998)</p>
<p>Project management knowledge</p> <p>Project managers must be able to take a holistic, rather than a reductionist approach to projects and must try to understand how relevant project tasks, activities and resources collectively interact to produce project outcomes. This requires the project manager to have workable knowledge of or skills and experience in the following four areas: (k) integration management (l) scope management (m) cost management and (n) risk management</p>	<p>Aramvareekul and Seider (2006), Baldry (1998), Cagno <i>et al.</i> (2008), Huang and Han (2008), Jiang and Heiser (2004), Khamooshi and Cioffi (2009), McPhee (2008), PMBOK Guide (2013), Spittler and McCracken (1996), Xenedis and Angelides (2005), Zayed <i>et al.</i> (2008)</p>
<p>Project manager roles</p> <p>Project managers must stimulate teamwork and high levels of personal motivation. They are required to utilize scarce resources effectively and to delegate decisions to specialized subordinates. This requires the project manager to undertake the following roles: (t) strategic thinker (u) effective delegator and (v) effective resource allocator</p>	<p>Baca (2007), Cheng <i>et al.</i> (2005), Cowie (2003), Jacques <i>et al.</i> (2008)</p>
<p>Project manager behavioral skills and attitudes</p> <p>Superior performance of the project manager roles will require the project manager to possess the following behavioral skills and traits: (o) loyalty to subordinates (p) loyalty to the organization (q) effective organizational politician (r) acceptance of responsibility and (s) honesty</p>	<p>Baca (2007), Burge (2008), Cheng <i>et al.</i> (2005), DiVincenzo (2006), Faraj and Sambamurthy (2006), Grenny <i>et al.</i> (2007), Jiang and Heiser (2004), McPhee (2008), Melin and Axelsson (2009), Pinto and Slevin (1988), Van Ingen (2008)</p>
<p>Project implementation monitoring</p> <p>The project manager must have a desire to excel on the project while managing internal project-related and client-related issues effectively. This will require the project manager to focus on the following issues: (w) incorporating decisions by the client (x) responding to changing client requests (y) incorporating decisions by the project team (z) dealing with internal project pressure and (aa) having a desire to excel on the project</p>	<p>Nguyen <i>et al.</i> (2004), Pinto and Slevin (1988)</p>

Source: Adapted from Gomes *et al.* (2012)

**Table I.**  
Project management  
planning and  
implementation  
literature

- P7. Project manager behavioral skills and attitudes will influence the performance of project manager roles.
- P8. Project manager roles will influence project implementation monitoring.
- P9. Technical knowledge will influence project implementation monitoring.

Further explanations of the elements of these propositions and the rationale for their use are presented below.

### *2.1 Interrelationships among public policy, organizational knowledge and technical knowledge*

Knowledge of the public-sector internal/external interface incorporates knowledge of public policy, stakeholder interactions and the use of politics to advance project success. Along with implementing public policy, the public sector has a real political need to satisfy its wide variety of stakeholders by demonstrating accountability and transparency (Crawford and Helm, 2009). Therefore, the public sector needs to extend its reach beyond bureaucratic boundaries to foster more effective government and stakeholder partnerships (Riege and Lindsay, 2006). To achieve this, the public sector and public-sector project managers must develop a better understanding of their internal and external stakeholders and develop policies and solutions that respond to stakeholder interests (Elias *et al.*, 2002). In this regard, Klijn and Koppenjan (2000) suggested that the public sector, which has a unique legitimacy to represent the common interest of its stakeholders, must have a key role in facilitating interaction among these stakeholders.

In addition, according to Pinto (2000), project managers and other key project personnel must understand the importance of organizational politics in addressing stakeholder needs and achieving project success. He stated, further, that effective managers must be willing to use appropriate political tactics to further their project goals. Sense and Antoni (2003) agreed indicating that not only project managers, but also project team members must learn to manage the political dimensions of projects effectively.

Organizational knowledge is a strategic asset that helps organizations to maintain a sustainable competitive advantage (Bollinger and Smith, 2001). This organizational knowledge resides in individuals, but also in a composite form across the organization. Learning from projects contributes to organizational knowledge through focusing on the interactions between technology, techniques and people to manage organizational knowledge effectively (Bhatt, 2001). Sense and Antoni (2003) suggested that, in addition to managing the political dimensions of projects effectively, it is only when project team members access, absorb and apply the multiple opportunities for acquiring organizational knowledge that exist within and across projects that the organization will achieve a competitive advantage in managing projects.

Consequently, a public-sector project manager who understands the role of public policy and the politics of dealing with the external and internal environment is likely to possess and use the organizational knowledge and skills needed to be effective in garnering executive and stakeholder support and harnessing the organizational knowledge needed to complete the project successfully.

The foregoing leads to the statement of *P1*.

In the context of this paper, technical knowledge entails organizational knowledge about technical aspects of a project such as the development and use of standards, codes and metrics that are needed to ensure that the project stays in compliance with all regulatory, statutory and stakeholder requirements. Meso and Smith (2000) suggested that organizations should adopt a broader socio-technical view of its organizational knowledge measurement system, placing emphasis not only on organizational infrastructure, culture and on people, but on technical aspects that ensure organizational compliance with laws, rules and regulations.



Public-sector project managers who understand the role of public policy and the politics of the external and internal environment are also likely to pursue, possess and use the technical knowledge and skills needed to complete the project successfully.

Hence, the above statement leads to *P2*.

*Interrelationships among technical knowledge, organizational knowledge and project management knowledge.* The PMBOK Guide (2013) provided a set of generic guidelines for the areas of knowledge required by project managers across organizations and across projects. But each organization and each project are different. Organizational knowledge and technical knowledge will be required to ensure that issues of project integration, scope, project cost and risk management fit the capabilities of the organization and the project team. Kotnour (2000) reported results from a survey of project managers that supports the theory that organizational knowledge incorporates and informs project knowledge, which, in turn, is associated with project performance. Furthermore, it was determined that project knowledge is associated with learning that occurs both within and across projects (Kotnour, 2000).

The expected interrelationships between technical knowledge, organizational knowledge and project management knowledge, alluded to above, yield the next three propositions: *P3–P5*.

*Relationship between project management knowledge and the project manager's behavioral skills and attitudes.* El-Sabaa (2001) detailed three basic skills of project managers, human skills, conceptual or organizational skills and technical skills that were based on an earlier categorization of administrative skills by Katz (1955). He found that the managers in his sample were relatively strong in human and organizational skills and less strong in technical skills. A survey performed by Cheng *et al.* (2005) indicated that while project manager job-task competencies were specific to their industry, behavioral competencies were generic. The results reveal that while their job-task competencies are highly specific to the industry in which they work, the behavioral competencies of superior project managers are mostly transferable in nature and apply to a range of other management positions.

The PMBOK (2013) detailed steps in the project plan which provides a map of what is required at the various stages of the project. For example, project timelines and events will be specified and responsible project team members will be identified. The project manager will need to determine the appropriate mix of behavioral skills and attitudes that will work best at different stages of the project and indeed across projects. In addition, the project manager will need to know which behavioral hat to wear when dealing with internal vs external project issues.

The foregoing leads to the next proposition: *P6*.

*Relationship between project manager behavioral skills and attitudes and project manager roles.* At various stages of the project the project manager will need to take on the different roles of strategic thinker, delegator and resource allocator. Sometimes, all three roles may intersect. The project manager will have to draw on his or her behavioral skills to ensure that the roles are carried out effectively. For example, the role of delegator will be enhanced if the project manager can mesh the attitude of concern for subordinates and the organization with the skills of an organizational politician.

The above statement leads to *P7*.

*Relationships between technical knowledge, project manager roles and project implementation monitoring.* In assessing the importance of monitoring and evaluation of projects, Lavagnon *et al.* (2010) found that project success was insensitive to the level of project planning, but that there was a positive correlation between the use of monitoring and evaluation tools and long-term project impact. As indicated earlier, technical knowledge

relates to the development of metrics that easily lend themselves to monitoring and therefore, makes it easier to monitor and control. Moreover, a principal responsibility of the project manager is to ensure that the project is meeting its targets, which can only be ascertained through effective monitoring. Our previous discussion on technical knowledge and project manager roles makes it plausible to proffer the final two propositions: P8 and P9.

A structural equation model will be used to test the propositions that are detailed above. The model represents proposed linkages and interrelationships among the factors listed above and displayed in Figure 2. Figure 2 contends that the public-sector project manager should possess knowledge about the interface between the internal policies of the agency sponsoring the project and the politics of its external stakeholders. This knowledge should guide the types of organizational and technical knowledge that the project manager needs to harness to assist in planning the project. After the project is planned, the project manager can then place major importance on managing, coordinating and monitoring the project which will require both technical and behavioral skills as well as an appropriate attitude that is aimed at achieving successful project implementation.

### 3. Methodology

#### 3.1 Instrument

The research instrument used in this study is an adaptation of the instrument first developed by Zimmerer and Yasin (1998) and used in several papers since then (Gomes *et al.*, 2008, 2012; Yasin *et al.*, 2000). The instrument development included translation and adaptation from the original US version to the reality of the Portuguese public sector. The instrument utilizes a mix of forced-answer and open-ended questions. With specific reference to this study, the research instrument asked the respondents to answer the following question with respect to each of the 27 items (labeled from “a” to “aa”) as listed in Table I: How important is this item in contributing to the success of public-sector projects that you have been involved in? Respondents were asked to respond using a Likert scale where “1” represented “very unimportant,” and “5” represented “very important.” The middle point of the scale “3” represented “neither important nor unimportant.” The research instrument also sought descriptive information about respondents and their organizations.

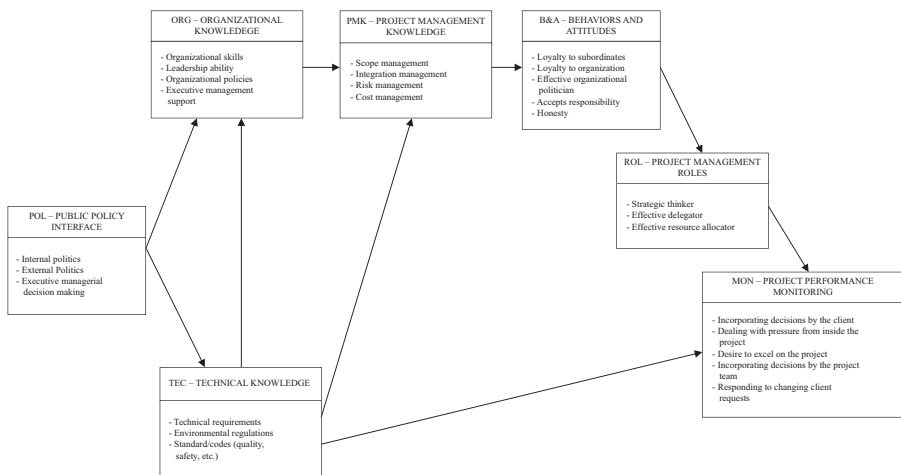


Figure 2.  
Research propositions

Source: Adapted from Gomes *et al.* (2012)

### 3.2 Sample, procedure and data analysis

The research survey instrument was distributed during several seminars offered by the Fundação CEFA (Foundation for Municipal Studies and Training), and conducted by the first author regarding strategy, performance measurement and project management in the Portuguese public sector. Table II presents a demographic profile of survey respondents with respect to their project management expertise and public-sector experience.

The participants were public-sector officials from the middle- and top-level management ranks. They represented 60 different local public institutions, mainly city halls. The participants represented all 18 of the administrative regions (districts) in Portugal. The survey was distributed to 235 participants at six seminars conducted in five cities in Portugal. Usable responses were received from 211 participants, resulting in a response rate of 89.8 percent. In addition to the relatively high response rate, the sample can be deemed to be representative of the populations studied.

As illustrated in Table II, more than 72 percent (72.0 percent) of the respondents had worked in the public sector for more than five years. Almost 27 percent (26.5 percent) were

Item	Frequency	%
<i>Years employed in public-sector organizations</i>		
0-2	0	0.00
3-5	3	1.42
6-10	41	19.43
11-15	52	24.65
16-20	40	18.96
21-25	24	11.37
> 25	19	9.00
Did not answer	32	15.17
Total	211	100.00
<i>Type of projects undertaken by the public-sector organizations</i>		
Routine type	79	37.44
Structured but not routine	94	44.55
Innovative projects	55	26.07
Substitution projects	25	11.85
Did not answer	16	7.58
<i>Number of projects respondent was involved in</i>		
1-5	50	23.70
6-10	24	11.37
11-15	13	6.16
16-20	8	3.79
21-25	2	0.95
> 25	23	10.90
Many	10	4.74
Did not answer	81	38.39
Total	211	100.00
<i>Number of projects respondent served as project leader</i>		
0	7	3.32
1-5	68	32.23
6-10	23	10.90
11-15	7	3.32
> 15	13	6.16
Many	7	3.32
Did not answer	82	38.86
Total	211	100.00

**Table II.**  
Project management  
and public-sector  
profiles of survey  
respondents

involved in more than ten projects, while only 3.3 percent of the participants had never served as a project leader. While about 37 percent (37.4 percent) of the projects undertaken were classified as routine projects, 26 percent (26.0 percent) were classified as innovative projects.

Structural equation modeling (SEM) was used to explore the relationships among the identified project management dimensions in order to evaluate the contribution of these dimensions to project implementation management. The two-step process of first estimating the measurement model and then assessing the structural model was utilized.

#### 4. Results and discussion

##### 4.1 Measurement model analysis

The measurement model consisting of all latent variables was analyzed. In order to validate the dimensions related to the model a confirmatory factor analysis (CFA) was performed using the AMOS 20.0 software. The results for the proposed seven-factor measurement model are presented in Table III. The table presents the results of the CFA including the standardized factor loadings and measures of composite reliability, construct validity and discriminant validity.

Dimensions	Std.	$\alpha$	AVE	CR
POL – public Policy Interface		0.64	0.40	0.65
Internal politics	0.75			
External politics	0.61			
Executive manager decision making	0.50			
ORG – Organizational Knowledge		0.77	0.44	0.75
Organizational skills	0.65			
Leadership ability	0.76			
Organizational policies	0.68			
Executive management support	0.53			
TEC – technical knowledge		0.69	0.44	0.75
Standard/codes (quality, safety, etc.)	0.73			
Technical requirements	0.72			
Environmental regulations	0.53			
PMK – project management knowledge		0.76	0.41	0.73
Scope management	0.53			
Integration management	0.72			
Risk management	0.63			
Cost management	0.53			
B&A – behaviors and attitudes		0.81	0.42	0.78
Loyalty to subordinates	0.70			
Loyalty to the organization	0.70			
Effective organizational politician	0.62			
Accepts responsibility	0.64			
Honesty	0.56			
ROL – project manager roles		0.67	0.42	0.68
Strategic thinker	0.50			
Effective delegator	0.74			
Effective resource allocator	0.69			
IMM – implementation monitoring		0.66	0.33	0.71
Incorporating decisions by the client	0.53			
Dealing with pressure from inside the project	0.58			
Desire to excel on the project	0.57			
Incorporating decisions by the project team	0.51			
Responding to changing client requests	0.67			

**Table III.**  
Results of the  
confirmatory analysis

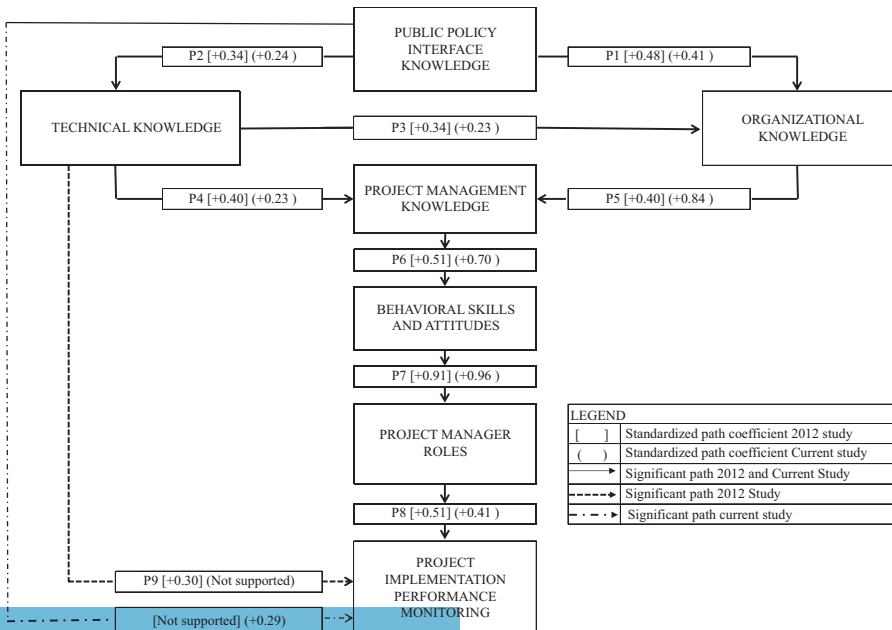
**Note:** All estimates are significant ( $p < 0.01$ )

The seven factors were examined for internal consistency and the results met the acceptable standards cited in the literature. Evidence of convergent validity was provided by the component reliability (CR) scores for each factor. The CR scores obtained are all above 0.6 which is the acceptable value for this index (Fornell and Larcker, 1981). The construct validity was assessed using the average variance extracted (AVE) index. With only one exception – the Implementation Monitoring Scale – with an AVE of 0.33, the AVE scores are relatively close to 0.5 which is the acceptable value according to Fornell and Larcker (1981). The discriminant validity of the measures was confirmed, verifying that the correlations between any two constructs are lower than their corresponding Cronbach’s  $\alpha$ s. All standardized factor loadings were highly significant ( $p < 0.01$ ) and all were larger than 0.5. Based on these results, it can be concluded that all constructs are unidimensional and meet acceptable levels of reliability and convergent validity. Hence, the estimated measurement model meets the acceptable levels cited in literature.

With respect to the goodness of fit of the measurement model, the  $\chi^2$  and relative  $\chi^2$  statistics ( $\chi^2 = 433.033$ ;  $p = 0.100$ ;  $\chi^2/df = 1.463$ ) indicate a good fit. The relative  $\chi^2$  statistic of 1.463 is below the critical high value of 2.0 suggested by Hair *et al.* (2009). Although the GFI of 0.870 does not reach the level of 0.9 as suggested by Schumacker and Lomax (1996), all other GFIs were acceptable. For example, the Tucker – Lewis index (TLI) of 0.911 and the comparative fit index (CFI) of 0.925 are both above the acceptable good-fit threshold of 0.9 suggested by Hair *et al.* (2009). The root mean square error of approximation (RMSEA) was 0.048, which also indicates a good fit of the proposed model, with values less than 0.05 being acceptable (Browne and Cudeck, 1993).

#### 4.2 Structural equation model results

Figure 3 presents the comparative results of the 2012 study and the current study. The paths representing the relationships in Figure 2 were found to be positive and statistically significant at the 0.01 level or lower. In the current study, the model produced



**Figure 3.** Results for the comparative models with standardized path coefficients

satisfactory goodness-of-fit measures (GFI = 0.867, TLI = 0.908, CFI = 0.920 and RMSEA = 0.048). Based on the results of the estimation of the structural model, including the overall fit of the model and the estimated structural paths, it is concluded that the overall model presents a reasonable explanation of the interrelationships among the project management dimensions included in this study. Except for *P9*, concerning the relationship between technical knowledge and project implementation monitoring, all other propositions from the 2012 study were supported in the current study.

#### 4.3 Discussion

The study results summarized in Figure 3 reveal several positive and statistically significant relationships among the proposed constructs. For example, organizational knowledge was determined to be positively and directly influenced by both public policy interface knowledge and technical knowledge. In addition, project management knowledge is influenced by both organizational knowledge and technical knowledge. Implementation management is positively and significantly influenced by project management roles and knowledge of the public policy interface. Public policy interface knowledge and technical knowledge appear to be the bases for project management activities during the planning stage since they have direct effects on both organizational knowledge and project management knowledge.

These results suggest that knowledge of the public policy interface, organizational knowledge, technical knowledge and project management knowledge are critical knowledge areas and skills for project managers in Portugal. Moreover, knowledge of the public policy interface appears to drive both organizational and technical knowledge. This finding is consistent with earlier findings by Pinto (2000) and Sense and Antoni (2003) that political knowledge and skills are necessary precursors for acquiring the organizational and technical skills and tools of project managers and project team members. From a TQM perspective, these findings can be viewed as confirmation that having a customer focus, in this case, a focus on understanding and seeking to meet the needs of the project's internal and external stakeholders is critical for enhancing project performance as suggested by Bryde and Robinson (2007), Loufrani-Fedida and Missonier (2015) and Peled and Dvir (2012). With respect to projects with significant environmental impact, Carton and Ache (2017) suggested, however, that external stakeholders, specifically citizens, should consider forming citizen-sensor-networks to gather information that can be used to ensure that all the public's environmental concerns are taken into consideration.

The results also suggest that during the implementation stage, the project manager's combination of technical and people-oriented skills will take precedence. The manager's ability to be an effective people manager will depend heavily on the behavioral skills and attitudes that he/she possesses. Qualities such as honesty, loyalty to the organization and to subordinates, and the ability to accept responsibility along with having the skills of an effective organization politician will help the project manager to perform the roles of delegating and of acquiring and allocating resources. Support for the utility of such skills in successful project managers has been prevalent in the literature (see e.g. Baca, 2007; Burge, 2008; Cheng *et al.*, 2005; DiVincenzo, 2006; Faraj and Sambamurthy, 2006; Grenny *et al.*, 2007; Jiang and Heiser, 2004; McPhee, 2008; Melin and Axelsson, 2009; Pinto and Slevin, 1988; Van Ingen, 2008). Loufrani-Fedida and Missonier (2015) suggested, however, that the success of a project depends more on the collective competences of the project team than solely on even the superior knowledge and skills of the project manager.

At the implementation stage, constant monitoring of the performance of the project becomes a major task. Having the ability and skills to delegate and allocate resources effectively becomes critical at this stage. Since effective project implementation management requires mediation with both external and internal constituencies, the



project manager's mediator role also becomes important at the implementation stage. In this regard, our findings also suggest that knowledge of the public policy interface provides additional guidance for dealing with internal and external constituencies at the implementation stage. Support for the importance of project monitoring is provided by Nguyen *et al.* (2004) and Pinto and Slevin (1988).

A major finding of this study in contrast to the 2012 survey results is that it suggests that public policy interface knowledge exerts a direct influence on implementation management. In the 2012 study and the current study, the public policy interface was found to have an indirect influence on implementation management through technical knowledge, organizational knowledge and project management knowledge. This suggests that the early period of economic decline in Portugal was characterized by public-sector responses that encouraged and required an increasing level of top management monitoring and management of both the planning and implementation processes. In contrast, the Gomes *et al.* (2012) study results had indicated that while top-level managers exerted major influence during project planning, project managers and their teams bore the primary responsibility for project implementation. One potential reason for this change is that the economic decline and the resultant government downsizing and reduced access to project funds inspired a greater need for public-sector accountability for the usage of the limited funds. Top management could no longer adopt a hands-off attitude to the project after approving and planning the project, it had to be intimately involved in monitoring the management of the implementation process.

Unlike the 2012, study results that supported the proposition that technical knowledge had a direct influence on the management of the implementation, responses in the current study indicate that the influence of technical knowledge on implementation management was more likely to be felt indirectly through organizational knowledge and project management knowledge. This may indicate that project managers have become better at incorporating the technical needs of the project into the specific areas of project management knowledge such as integration, scope, cost and risk management. Another plausible explanation is that the "softer" aspects of project management become more critical in ensuring successful implementation as project managers try to operate within the constraints of a leaner public sector. This explanation is buttressed by the fact that organizational knowledge was found to have a stronger influence on project management knowledge than in the 2012 study results and that project management knowledge was found to have a stronger influence on project manager behavior and attitudes than in the 2012 study.

In summary, the results presented in Figure 3 support eight of the nine propositions and, therefore, represents significant replication of the Gomes *et al.* (2012) study results. The current study did not provide support for *P9* concerning the direct influence of technical knowledge on implementation performance monitoring. Rather, it suggests that public policy interface knowledge exerts a direct influence on implementation management, a relationship that was not found to be significant in the Gomes *et al.* (2012) study.

## 5. Conclusions

Based on the results of this study, the following conclusions and their implications are provided using an organizing framework consisting of three headings which are synonymous with the TQM philosophy: customer focus, employee involvement and continuous improvement. A fourth heading "integration" is used to discuss items that do not fall neatly into either of the three headings but is relevant to more than one heading. It should be noted that, since these results have been garnered from a study of Portuguese public-sector managers these implications are geared specifically to the Portuguese public sector. However, there is a likelihood that some of these implications may also be valid in other European countries that are facing similar economic problems.

### 5.1 *Customer focus*

The importance of knowledge of the public policy interface at the planning and implementation stages of the project was strongly supported by this study. This suggests that Portuguese public-sector organizations should view projects from an open-system perspective and pay careful attention to the management of the external and internal aspects of the project, particularly in instances where the external and internal constituencies need to interact. Since public-sector projects are subject to greater external influences than typical projects in the private sector, public-sector managers must ensure that the interests of all external stakeholders are considered. Projects may also have to be promoted and reported publicly to meet the need for responsiveness and accountability and to ensure public support and effective outcomes.

Effectively dealing with external factors is a key to the success of public-sector projects. However, while public-sector organizations must ensure that projects meet the needs of their external constituents they should also seek to ensure that these projects do not overly test the capabilities of the organization's internal constituents. Public/Private sector projects may prove to be suitable alternatives when public-sector capabilities and resources are insufficient. In this regard, projects may have to carefully define and differentiate internal and external customers and ensure that TQM and project-specific procedures and processes are developed to ensure that an adequate level of focus is applied to each group throughout the various stages of the project.

### 5.2 *Employee involvement*

The study results indicate that there is a need for direct top management involvement at both the planning and implementation stages of public-sector projects. In periods of economic uncertainty and public-sector reform there is no doubt that effective top management accountability requires a more hands-on approach to the management and monitoring of projects. However, this goes against the concept of "top-down planning and bottom-up implementation" and has major implications for the day-to-day management of projects and for the power, roles and influence of the project manager during implementation. In such circumstances there is a need for a clear demarcation of the roles and responsibilities of the relevant top manager(s) or project champions and project managers.

During implementation, top managers or project champions must not be seen as unnecessarily intruding on the project or usurping the power of the project manager. One way of achieving this may be through improvements in information sharing between the top manager/project champion with specific responsibility for the project and the project manager with the intent of allowing the project manager to maintain control of the day-to-day project activities with the informed consent and, where necessary, guidance of the top manager. Improvements in information systems may be required to ensure that top managers have access to real-time, easily and seamlessly accessible reports and other information on their project's activities.

The project manager has a significant role to play in encouraging and enhancing employee involvement. Liaising with top management to ensure adequate resources for the project is important. However, it is also important for the project manager to be supportive of the project team and to encourage and value their input to the project. For public-sector projects, the TQM concept of employee involvement may have to be broadened to include government executives, project managers and teams, project staff, project consultants, and key contractors and subcontractors.

### 5.3 *Continuous improvement*

The competencies and attitudes of public-sector project managers affect how they play their roles during project implementation. Our findings support an earlier finding by Gillard (2009)

which suggested that project managers should have an appropriately balanced profile of technical skills and “soft” managerial skills to successfully fulfill their roles. Furthermore, our study found that while technical skills were especially important in the planning stage, the supposedly “softer” managerial skills took precedence during implementation. This should have some impact on how public-sector project managers are educated and trained. Some previous studies had addressed the types of training programs that would be more conducive to the effective training of project managers, in general, indicating that graduate, certificate and organizational training programs were needed Carbone and Gholson (2004). Our findings suggest, further, that to achieve maximum benefits from projects, public-sector organizations may have to invest in training programs that focus on continuous improvements in technical knowledge and skills as well as training programs that are geared toward enhancing management and leadership capabilities.

Public-sector project manager development is very important for the Portuguese public sector. But any training and development efforts must take the peculiar circumstances of the Portuguese culture into consideration. Canned project management training programs from other cultures may not be effective. In this regard, concerns about time management, knowledge management and knowledge sharing must be addressed in order to improve the project manager’s chances of success. There is a role for universities and other institutes of higher learning in the development of project managers that are responsive to time requirements of their projects while being flexible and adaptable to constant change. In this regard, particular attention needs to be paid to ensuring that any new managerialism (the application of business management techniques and methods to the operations of the public sector) proposed in these training and development programs has a high probability of being transferred and accepted in public-sector settings.

#### 5.4 Integration

The results also point to desirable linkages between the public policy interface, organizational skills, project manager behavior and project manager roles. Since managers within a given public-sector organization are more likely to be familiar with their internal and external constituents, recruitment of project managers from within the organization may decrease the lead time to form alliances with internal and external constituents and thereby help to improve the prospects for positive project outcomes. However, it should be acknowledged that there are instances, such as in cases of entrenched bureaucracies, where choosing an external project manager may be a more desirable option.

#### 5.5 Limitations and future research

This research has thrown some additional light on the relationship between the roles of public-sector project managers and required technical and managerial skills during project planning and implementation. However, there is still much to be discovered. It is highly likely that some of our findings may not hold true in the global context and particularly in the context of private sector projects. Therefore, researchers are invited to attempt to replicate our findings in the public sectors of other countries and in private sector studies.

In addition, there are many other variables related to organizational knowledge, project management and project manager behavior that could not be included in this study. While the goodness-of-fit measures indicate that the proposed model is acceptable, most of the AVE measures used to assess construct validity, though relatively close to the critical value of 0.5 did not exceed the critical value. Furthermore, one of the Cronbach’s  $\alpha$  values, though acceptable, is close to the lower threshold value of 0.6. Therefore, researchers are encouraged to extend the constructs covered in the study by including other planning and implementation variables with the objective of improving the reliability and construct validity of the scales. For example, the variables contained in the project management

knowledge construct were derived from the PMBOK (2013) published by the Project Management Institute. A more comprehensive set of variables may be obtained using the International Project Management Association Competence Baseline, a framework that provides guidelines for the acquisition of technical, behavioral and contextual project management skills. Researchers who are interested in extending the TQM findings should also consider researching the use of ISO 21500 components that address TQM structure and terminology. Studies that consider all aspects of the project life cycle from selection to termination are also encouraged. In this regard, studies that incorporate findings related to project success factors including quality, time and budgets would be very important. Moreover, studies that consider non-technical project success measures such as internal and external stakeholder satisfaction with the project are also necessary.

Our sample size of 211 is representative of its underlying population of project managers in municipalities across Portugal and is comparatively large in relation to other empirical management studies from Portugal. However, other large-scale investigations into the topics covered by this research are encouraged. Finally, the results of this study indicate that, collectively, our respondents believe that adoption of some components of TQM can contribute to project success. However, a major question remains: will TQM work for all public-sector projects? And, if not, what particular characteristic of a project would make it more amenable to TQM solutions? These and other questions should provide much fodder for empirical research into the future.

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#### Corresponding author

Carlos F. Gomes can be contacted at: [cfgomes@fe.uc.pt](mailto:cfgomes@fe.uc.pt)

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