Available online at www.sciencedirect.com

ScienceDirect

International Journal of Project Management 35 (2017) 169–179

International Journal of Project Management

www.elsevier.com/locate/ijproman

Strategic planning characteristics applied to project management

Karen E Papke-Shields *, Kathleen M. Boyer-Wright

Information and Decision Sciences Department, Franklin P. Perdue School of Business, Salisbury University, 1101 Camden Avenue, Salisbury, MD 21801, USA

Received 7 March 2016; received in revised form 15 October 2016; accepted 25 October 2016

Abstract

This paper examines the application of strategic planning characteristics from prior strategic planning research to project management. Drawing from prior research in strategic planning, strategic information systems planning and strategic manufacturing planning, this research combines strategic planning characteristics derived from a rational approach with a second set of adaptive characteristics to create a comprehensive model. The resulting "rational adaptive" approach is then assessed empirically to evaluate its relevance to PM and whether it is associated with increased project success. In addition, the "rational adaptive" approach is mapped to established PM tools/techniques. Findings indicate that PM is captured by varying degrees of a rational adaptive approach, which is positively correlated with PM success and use of PM tools/techniques. These results suggest that strategic planning characteristics can be effectively incorporated into a generalized PM framework, yielding potentially useful insights regarding the relationship of PM behaviors to eventual project success.

Keywords: Strategic planning; Project management approach; Project success; Empirical research

1. Introduction

The use of projects in organizations has increased steadily over the last several decades. Although there has been some indication that projects are becoming more successful, there is still evidence that a substantial number of projects do not meet goals or expectations (Allen et al., 2014). McKinsey and Company (2012) found that, on average, large information technology (IT) projects "run 45 percent over budget and 7 percent over time, while delivering 56 percent less value than predicted." The Standish Group's CHAOS Project, which tracks IT projects over time, shows limited progress in successful project completion over the last two decades. (http://www.standishgroup.com).

With this increasing use of projects yet limited project success, examination of PM success and failure continues to be an area of considerable interest (Allen et al., 2014). Leybourne (2007) reviewed the changing emphasis of PM research, recognizing a number of areas that have been examined in the past: identification of critical success factors, evaluation of specific PM methods, and assessment of PM tools/techniques. Although findings from such studies have certainly contributed to the PM field, the research has been limited to a narrow set of constructs. As Leybourne (2007) discusses, it may be time to move beyond them.

Several authors have pointed out the lack of theoretical underpinnings in PM research (e.g., Drouin and Jugdev, 2014; Killien et al., 2012; Parker et al., 2015; Patanakul and Shenhar, 2012) recommending application of theory from related disciplines to advance PM as a field. Drouin and Jugdev (2014, p. 64) state that use of existing theory and constructs will "foster credibility of the findings" but the "current state of theoretical evolution in PM hampers researchers in using well-developed concepts to investigate by operationalizing constructs with existing valid and reliable instruments or items from instruments." Examples of such research are studies by Drouin and Jugdev (2014), Killien et al. (2012), and Parker et al. (2015), which adapted the resource-based view from the strategic management field within a PM context.

The current study applies strategic management theory—specifically, strategic planning characteristics (SPCs)—to develop an expanded and more generalized PM approach. The research

* Corresponding author.
E-mail addresses: kepapke-shields@salisbury.edu (K.E. Papke-Shields), kmwright@salisbury.edu (K.M. Boyer-Wright).

http://dx.doi.org/10.1016/j.ijproman.2016.10.015
0263-7863/00/

combines SPCs derived from a formal ("rational") approach to strategic planning with a second set of adaptive SPCs to create a comprehensive model. The resulting "rational adaptive" approach is assessed empirically to evaluate its relevance to PM and whether it is associated with increased project success. In addition, the "rational adaptive" approach is mapped to established PM tools/techniques. Findings indicate that PM is captured by varying degrees of a rational adaptive approach, which is positively correlated with PM success and use of PM tools/techniques. These results suggest that SPCs can be effectively incorporated into a generalized PM framework, yielding potentially useful insights regarding the relationship of PM behaviors to eventual project success.

The paper is organized as follows. Section 2 reviews the relevant PM and strategic planning literature and develops the conceptual framework for this study leading to articulated hypotheses. The research methodology is described in Section 3 followed by the results of a practitioner field survey in Section 4. Implications of research findings are discussed in Section 5. Sections 6 and 7 conclude the paper by summarizing contributions and limitations of this current study with suggestions for follow-on research.

2. Literature review

The PM process, its implementation through planning and execution, and relationship to project success is a continual focus of PM research. Acknowledging differences in context, it can be argued that the PM literature has striking parallels with strategic planning research, which examines the relationship between how planning is done and the success of that planning process. In this section, a brief discussion about prior research on PM is followed by an introduction of planning characteristics from the strategic planning literature and a discussion regarding the appropriateness of applying these SPCs within a PM context.

2.1. Project management

Prior research about PM has tended to focus on critical success factors, PM methods, and/or PM tools/techniques. Critical success factors (CSFs) are "characteristics, conditions, or variables that can have a significant impact on the success of the project when properly sustained, maintained and managed" (Milosevic and Patanakul, 2005, p. 183). Numerous CSFs have been identified in different studies. Fortune et al. (2011) found that "clear goals/objectives," "realistic schedule," "support from senior management," and "adequate funds/resources" are the most frequently cited CSFs. Borman and Janssen (2013) found that CSFs can be related to the outcome, implementation process, or the operating environment of a project. Borman and Janssen (2013 p 397) found that although awareness of CSFs in these categories did impact a shared services project, "operating environment factors such as having a unified organizational structure are different again since they are unable to be managed or changed as part of the shared services initiative." Therefore, a number of previously identified CSFs may be outside the control of those involved in the project.

In contrast, research examining PM methods, which "provide guidelines and checklists to ensure that practices are being followed properly," has a much narrower focus (Jugdev et al., 2013, p. 537). Methods generally have been derived from the different PM standards (e.g., A Guide to the Project Management Body of Knowledge (PMBOK® Guide), 2008; PM Guide 2.0, 2010; The APM Body of Knowledge, 2006) and tend to be prescriptive in nature. Evaluations of PM methods have varied from one study to the next with mixed results for the relationship between PM methods and project success. Gowan and Mathieu (2005) examined 5 broad practices including problem identification, risk assessment, cost calculations, compliance planning, and testing and verification. Dvir et al. (2003) examined development of functional requirements, development of technical specifications, and implementation processes and procedures. And White and Fortune (2002), Fortune et al. (2011), and Jugdev et al. (2013) included methods based on the PMBOK® Guide (2008) and in-house methodologies. Almost all of these studies found a significant relationship between at least some of the PM methods and project success; however, it is hard to find a consistent pattern.

Numerous studies have also evaluated various project management tools and techniques. According to Jugdev et al. (2013, p. 537), "PM tools and techniques are intended to help practitioners do their job and to execute processes." Besner and Hobbs (2006) examined 70 commonly recognized tools and techniques derived from the PM literature. Several studies have used PMBOK® Guide (2008) related tools/techniques (e.g., Crawford and Pollack, 2007; Ling et al., 2009; Zwikael and Globerson, 2004). There has been more consistency in the tools/techniques across studies than those found with PM methods. In one such case, Zwikael and Globerson (2004, 2006) developed artifacts based on PMBOK® Guide (2008) to examine the use of different tools/techniques, and these artifacts were later used by Papke-Shields et al. (2010). Another finding of this work was that widely used tools/techniques do not necessarily demonstrate the strongest relationship with success. Fortune et al. (2011) and Jugdev et al. (2013) extended work done by White and Fortune (2002) including both the use of tools/techniques along with PM methods, recognizing the relationship between them.

Consistent findings relating tools/techniques to a more generalized approach to PM suggest that this is potentially a productive area for further exploration and research. In addition, there have been a number of recommendations to apply research constructs and frameworks from related disciplines to create a theoretical foundation for advancing the field of PM. Projects are often initiated as part of a broader strategic planning process, thus the field of strategic planning would seem to be an appropriate source of ideas for planning and managing projects. Indeed, a review of the strategic planning literature reveals a robust framework and planning approach that corresponds to existing PM practices and that can be readily adapted to individual projects.

2.2. Strategic planning

The field of strategic planning has an extensive history that includes the emergence of multiple and competing theories to explain the strategic planning process and its relationship to achieving management objectives. Two schools of thought that have received the majority of the attention are the "planning" or rational school and the "learning" or adaptive school, which reflect polar extremes in terms of the planning approach that should be used (Mintzberg, 1987; Papke-Shields et al., 2002; Patanakul and Shenhar, 2012; Segars et al., 1998). The planning school calls for a rational approach to strategic planning that is structured and controlled, while the learning school posits that planning cannot be deliberately controlled, rather it emerges and adapts over time (Camillus, 1982; Fredrickson and Mitchell, 1984).

In actual practice, the clear demarcation between the planning and learning approaches has become blurred, with the debate on strategic planning moving from an "either/or manner" to an integrative approach (Meissner, 2014 p 108). For example, with respect to strategic information systems planning (SISP), results from several field studies suggested that "high performing systems for SISP seem to contain aspects of both adaptation and rationality" (Segars et al., 1998 p 312). Subsequently, Segars et al. (1998) demonstrated that effective SISP does reflect "rational adaptation," incorporating aspects of both schools of thought. A similar finding was observed by Papke-Shields et al. (2002) for strategic manufacturing planning (SMP). A generalized interpretation from both studies is that combining rational and adaptive SPCs creates a hybrid approach. In this view, rational attributes provide structure and breadth of alternatives for careful analysis and planning while the adaptive aspects incorporate multiple views and promote frequent monitoring and adjustment to enhance responsiveness to changing circumstances.

This combination of rational and adaptive characteristics represents a planning system or pattern of planning characteristics in an organization (Lederer and Sethi, 1996; Lorange and Vancil, 1977). Such a pattern of characteristics is seen in the "rational adaptive" approach observed in SISP and SMP where the combination of SPCs was captured as a second-order factor. Lorange and Vancil (1977, p. 144) stated that "A planning system has two major functions: to develop an integrated, coordinated and consistent long-term plan of action, and to facilitate adaptation of the long-term efforts of the corporation to changes in the environment." This clearly reflects the "rational adaptive" combination of SPCs observed in SISP and SMP.

Among the SPCs that have been examined across studies are formality, comprehensiveness, participation, and intensity (Table 1) (Das et al., 1991; Hart, 1992; Papke-Shields et al., 2002; Segars et al., 1998). These SPCs reflect aspects of both schools of thought on strategic planning—the rational school (formality, comprehensiveness) and the learning school (participation, intensity)—as well as capturing aspects of PM. And the combination of these planning characteristics reflect a planning system as opposed to the specific conditions, recommended steps, or commonly used tools/techniques that have been the primary focus in PM research.

Table 1
Strategic planning characteristics—construct, prior conceptualizations, and measure.

Construct and coefficient alpha	Prior conceptualizations and measurement items [1]
Formality 0.74	*Extent to which the planning process is structured (through written procedures, schedules, and other documents) and the results documented* Policies and procedures greatly influence the project planning process. Our process of project planning is very structured. Written guidelines exist to structure project planning. The process and outputs of project planning are formally documented.
Comprehensiveness 0.80	*Extent to which an organization considers all possible strategic alternatives* We attempt to be exhaustive in gathering information relevant to project planning. Before a decision is made, each possible course of action is thoroughly evaluated. We attempt to determine the optimal courses of action from alternatives. We will delay decisions until we are sure that all alternatives have been evaluated.
Participation 0.75	*Extent to which different and diverse interest groups participate in the planning process* Our process of project planning includes numerous participants. Project planning is a relatively isolated activity. [2] Project team members are involved in the project planning process. The level of participation in project planning by diverse interests is high. Clients or end-users are commonly involved in planning processes.
Intensity 0.70	*Extent to which resources are committed to planning as seen in the frequency and level of attention to plans)* We constantly evaluate and review project plans. We frequently adjust project plans to better adapt them to changing conditions. Project planning is a continuous process during the life of the project. We frequently schedule face-to-face meetings to discuss project issues.

[1] Based on Papke-Shields et al. (2002) and Segars et al. (1998).
[2] Reverse-coded item.

2.3. Hypotheses

The distinction between the rational and adaptive approaches to planning is not completely unique to the strategic planning field and has been observed in the PM literature as well. Shenhar and Dvir (2007) distinguished between more traditional and more adaptive approaches to PM. Rostaldås (2008) identify two schools of project planning—one that emphasizes planning and control techniques and another that emphasizes organization and human relationships. Rostaldås et al. (2014) differentiate the two schools of project planning as "prescriptive" and "adaptive," where the prescriptive approach emphasizes planning and control techniques while the adaptive approach incorporates the organizational and human relationship perspective.

Individual characteristics associated with alternate strategic planning approaches are also found in the PM field. Formality is the most evident and can be observed in published methods and tools/techniques designed to guide and document project planning (PMBOK® Guide (2008); The PM Guide 2.0 (2010); PRINCE®). The prescriptive nature of these methods implies a formal process for planning and managing projects. Comprehensiveness is observed by Tasevska et al. (2014) in the extensive use of "systematic identification of alternative ERP solutions" and "systematic selection of the preferred ERP solution". The relevance of participation was observed by Tasevska et al. (2014) through widespread reporting that "relevant departments participated in the planning process" as well as frequently cited critical success factors such as "considering multiple views of project" (Fortune et al., 2011). Finally, planning intensity can be observed in frequently cited critical success factors such as "effective monitoring and feedback," "flexible approach to change," and "provision of planning and control systems" (Fortune et al., 2011) and in the use of different tools/techniques associated with revisiting and revising project plans (Papke-Shields et al., 2010).

Support for a rational adaptive approach to PM is seen in discussions of expectations and observations about project planning. Describing project strategy, Patanakul and Shenhar (2012, p. 6) reference Mintzberg (1987) stating that he "argued, correctly, that strategy can involve a deliberate approach, an emergent one, or a combination of both." Rostaldås et al. (2014) observed that companies had both "formal qualities" (prescriptive or rational approach) and "informal qualities" (adaptive approach) in their planning although the order of using the approaches may differ. Tasevska et al. (2014) included items that reflect formality, comprehensiveness and participation to measure the planning dimension of "business case". This leads to the first hypothesis about the PM approach as captured by SPCs:

Hypothesis 1. The project management approach used in organizations will reflect some degree of a rational adaptive approach.

A rational adaptive planning approach was found to lead to more successful planning in both SISP and SMP (Papke-Shields et al., 2002; Segars et al., 1998). Both studies assessed planning success using a multidimensional construct combining results from the planning process with attainment of business objectives. Focusing on PM, Patanakul and Shenhar (2012, p. 6) argue that rational adaptive planning will produce superior outcomes, citing Mintzberg (1987) in positing that "the most effective strategies were developed by combining deliberation and control with flexibility and organizational learning."

Despite some discrepancy in findings, there is evidence that formal and comprehensive processes, which incorporate prescribed PM methods and/or tools/techniques, have been associated with greater project success (e.g., Besner and Hobbs, 2006; Gowan and Mathieu, 2005; Ibbs and Kwak, 2000; Jugdev et al., 2013; Papke-Shields et al., 2010; Shenhar et al., 2001; Tasevska et al., 2014; Zwikael and Globerson, 2004). A relationship between greater user participation and the quality of information systems project planning has also been identified (Sridhar et al., 2009). Artifacts demonstrating project review and revision have been found to be related to project success (Papke-Shields et al., 2010), and commonly cited CSFs reflect planning intensity. Finally, Tasevska et al. (2014) found that inclusion of formality, comprehensiveness, and wider participation is correlated with measured dimensions of success. This leads to a second hypothesis addressing PM approach and success:

Hypothesis 2. A rational adaptive approach to project management will be associated with greater project success.

Of the work examining CSFs, use of PM methods and PM tools/techniques, research examining the latter has produced the most consistent measures and results. Many tools/techniques, such as those associated with scheduling, budgeting, and scope planning, reflect a more rational approach to PM. This is not surprising given the prominence of the "triple constraint" in PM in the past. Zwikael and Globerson (2004, 2006) and Papke-Shields et al. (2010) found that tools/techniques associated with the "softer" side of PM, such as communication, human resources, quality and risk, also have a strong relationship with project success. These tools/techniques reflect the more adaptive aspects of strategic planning. Tasevska et al. (2014) found a very strong relationship between "business case" and "baseline plan," which reflect aspects of both the SPCs and PM tools/techniques, respectively. These results suggest that an organization using a rational adaptive PM approach would, by the very nature of the approach, also be likely to use a variety of PM tools/techniques. This leads to a third hypothesis addressing the use of PM tools/techniques.

Hypothesis 3. A rational adaptive approach to project management will be associated with the use of a variety of PM tools/techniques.

3. Methodology

As noted in Smyth and Morris (2007), reinforcing interactions between academic researchers and practitioners has resulted in a research paradigm that is dominated by empirical assessment and hypotheses testing. The current study follows this tradition by empirically testing hypotheses using a survey methodology. Also consistent with research best practices, the measures used in this analysis have been derived from prior research—project success and PM tools/techniques from the PM literature and SPCs from the strategic planning literature. As explained in detail later in this section, the statistical analysis is done via categorical variables and with multiple dependent variables, so multiple analysis of variance (MANOVA) is used.

3.1. Measures

Project success was measured as a multidimensional concept given the more current understanding of the construct in the PM literature (e.g., Cooke-Davies, 2002; Fortune et al., 2011; Serrador and Turner, 2015; Shenhar and Dvir, 2007; Shenhar et al., 1997). Cooke-Davies (2002) differentiated between "project management success" and "project success" with the former referring to meeting time, cost, and scope goals while

the latter refers to meeting the strategic objectives of the organization. Shenhar et al. (1997) made a similar differentiation among four dimensions: efficiency (e.g., meeting schedule and cost goals), impact on the customer (e.g., meeting functional performance, meeting technical specifications, customer satisfaction), business success (commercial success, large market share), and future potential (creating a new market, creating a new product line). More recently, impact on the team has been included as a dimension (Turner and Zolin, 2012; Shenhar and Dvir, 2007).

This study uses a multidimensional measure of project success: meeting cost and time goals (reflecting PM success or efficiency); meeting technical specifications, meeting quality requirements and customer satisfaction (reflecting project success and impact on the customer); and achieving business objectives (reflecting project success and business success). Achieving business objectives is more generic than the dimensions identified by Shenhar et al. (1997), but has been used in other studies as a measure of business success (White and Fortune, 2002; Papke-Shields et al., 2010; Thomas and Fernandez, 2008). This multidimensional measure also corresponds to the measure of planning success used in strategic planning research, which included measures reflecting the planning process and the outcomes of that process (Papke-Shields et al., 2002; Segars et al., 1998).

Different dimensions of project success have been observed to be more appropriate during different stages of the project (Turner and Zolin, 2012; Shenhar et al., 1997). Shenhar et al. (1997) observed that "efficiency" applies during and immediately following project execution, "impact on the customer" applies immediately following the project to a few months after delivery to the customer, "direct" or business success applies from 1 to 2 years after project completion, and "future potential" applies 3–5 years after completion. In the current study, respondents were asked to complete the survey based on projects in which they had been involved within the last 2 years, eliminating the applicability of "future potential" measures.

Similar to other studies of PM tools/techniques (e.g., Crawford, 2005; Crawford and Pollack, 2007; Ling et al., 2009), measures were derived from PMBOK® Guide (2008) spanning all of the knowledge areas. This standard is consistent with others (e.g., PM Guide 2.0, 2010; APM Body of Knowledge, 2006) in that they capture evolving knowledge in the field of PM. Items were fashioned after those used by Zwikael and Globerson (2004) and Papke-Shields et al. (2010). These items did not measure use of a particular tool or technique, rather, they measured presence of an expected artifact as a result of using different tools or techniques. Items used by Zwikael and Globerson (2004) were limited to project planning, while Papke-Shields et al. (2010) included artifacts associated with additional process groups or phases (initiation, and monitoring and controlling). The latter were adopted for this study. Given the large number of tools/techniques, measures used for analysis combine the tools/techniques in each PMBOK ® Guide (2008) knowledge area, referred to here as PM practices (Table 2).

Measures for the strategic planning characteristics (formality, comprehensiveness, participation, and intensity) reflect prior conceptualizations of these constructs in the strategic management literature and were derived from prior research in SISP and manufacturing strategic planning (Papke-Shields et al., 2002; Segars et al., 1998). This recognizes the importance of using "reliable instruments or items from instruments" articulated by Drouin and Jugdev (2014, p. 64). Items for each construct are included in Table 1 along with the conceptualization of each construct.

Table 2
Observed PM practices.

PM knowledge area	Observed practice (artifact)	Mean and std. dev.	Coefficient alpha
Integration	Project plan	3.41 (0.82)	0.68
	Project charter		
	Stakeholder analysis		
	Feasibility study		
Scope	Scope statement	3.76 (0.65)	0.79
	Scope change proposal		
	Scope statement update		
	Project deliverables list		
	WBS		
	WBS update		
Time	Project schedule	4.03 (0.69)	0.76
	Schedule baseline		
	PERT or Gantt chart		
	Schedule update		
	Project activities list		
	Activity duration estimates		
	Activity list update		
Cost	Time-phased budget plan	3.51 (1.05)	0.90
	Cost baseline		
	Cost baseline updates		
	Activity cost estimates		
	Cost estimate updates		
	Cost performance reports		
Quality	Quality management plan	2.90 (1.03)	0.88
	Quality checklists		
	Defined quality metrics		
	Quality metric results		
	Quality audit		
	Quality change proposals		
Human resources	Roles and responsibilities list	3.27 (0.85)	0.80
	Responsibility assignment matrix		
	Project staff assignments		
	Team-building event		
	HR change requests		
Communication	Communication management plan	2.97 (0.99)	0.84
	Communication requirements analysis		
	Information gathering and retrieval system		
	Information distribution plan		
	Communication change request		
Risk	Risk management plan	2.79 (1.03)	0.89
	Risk register		
	Risk register updates		
	Contingency plan		
	Quantitative risk analysis		
	Pre-planned risk response mechanism		
Procurement	Procurement management plan	3.24 (1.08)	0.84
	Contract statement of work		
	Bid documents		
	Supplier evaluation criteria		
	Supplier proposal evaluation		

3.2. Survey

The initial survey contained six items to capture different dimensions of project success, twenty-one items for SPCs, and fifty-eight items for PM tools/techniques across the nine PM knowledge areas in PMBOK® Guide (2008) (all as 5-point Likert scales with prompts from Never/Strongly Disagree (1) to Always/Strongly Agree (5)). Six local project managers completed the initial survey indicating items that were not easily understood. Their responses were used to refine the initial survey, dropping six PM practices to achieve the final list organized by knowledge area in Table 2. No problems were identified with the measures for project success or SPCs. In addition to these measures, the final survey included information about the respondent's organization (industry type based on NAICS; organization size captured as number of employees and sales volume) and projects (respondent's role in project; project size captured as typical cost, duration, and number of people).

The final survey was posted on the web site of a large regional chapter of the Project Management Institute® in the US. Chapter leadership sent an initial and follow-up email to each member of the chapter with information about the survey and a link to it. Respondents were instructed to answer based on projects in which they had been involved in the past 2 years. A total of 142 responses, approximately 10% of the chapter membership, were obtained. Of the respondents, 68% were project managers, 13% were project team members, and 19% were "other" such as project champion or stakeholder. Several respondents lacked responses for a number of questions, particularly those related to SPCs, and were not used in the analysis since it appeared that they lacked sufficient knowledge, giving a total of 118 usable responses. Respondents represented a number of different industries, organizations based on size, and projects based on size (Table 3). A test for non-response bias was used, with no significant differences found when comparing early and late responders on a number of variables (contextual, success, project characteristics, PM practices) (Armstrong and Overton, 1977).

4. Results

An initial examination of the different measures was conducted to evaluate internal consistency of each construct. Cronbach's alpha, the "widely employed measure of reliability of a scale" in project management research (Yalegama et al., 2016, p. 647), was used for the different SPCs (Table 1) and PM practices (Table 2). The results indicated good internal consistency for each of the constructs as measured. This was not unexpected given that the measures had been used and validated in prior studies. Since success was measured as a single-dimensional construct, Cronbach's alpha was not appropriate. The different measures of success were evaluated to see if they were highly correlated as seen in previous research addressing both strategic planning (e.g., Papke-Shields et al., 2002) and project management (e.g., Dvir et al., 2003). The results indicate that the different dimensions of success were indeed highly correlated with the exception of "attaining quality requirements" with "meet cost target" and "meet schedule target" (Table 4). This is consistent with the trade-off relationship between quality and time or cost seen in the "iron triangle" (Atkinson, 1999) or observed in studies (e.g., Swink et al., 2006).

Multiple industries are represented in the sample, with organizations and projects of various sizes (Table 3). Given that prior studies have shown a contextual effect on project success or methods (e.g., Crawford and Pollack, 2007; Gowan and Mathieu, 2005; Shenhar et al., 2001), possible relationships between the context in which the projects occurred and either project success or planning approach are examined. Industry, organization size, and project cost are categorical variables while project duration and number of people on the project are continuous variables, so analysis of variance and regression are used, respectively. The lack of significance in both cases indicate that neither project success nor use of SPCs differed based on context. The respondents reflect project managers (68%), project team members (13%), and "other" (19%) including project champions and stakeholders.

Table 3
Respondent demographics.

Industry (NAICS)		Organization size	**No.**	Project size	**No.**
Utilities	4	*Sales volume*		*Project cost*	
Construction	6	<$50 M	27	<$100 K	22
Manufacturing	9	$50–100 M	17	$100–325 K	16
Transportation and warehousing	1	$100–250 M	9	$325–500 K	17
Information	23	$250–500 M	8	$500 K–$1 M	15
Finance and insurance	13	$500 M–$1 B	14	>$1 M	48
Professional, scientific and technical services	28	>$1 B	23		
Management of companies and enterprises	1	Unsure	20	*No. of participants*	
Education services	3			1–10	52
Health care and social assistance	8	*No. of employees*		11–50	45
Arts, entertainment, and recreation	1	<100	19	51–100	15
Other services	14	100–1000	35	>100	6
Public administration	7	1000–5000	17		
		5000–10,000	11	*Duration (months)*	
		10,000–25,000	8	1–12	76
		>25,000	21	13–24	22
		Unsure	7	25–36	10
				>36	9

Table 4
Relationships between project success dimensions.

Success dimension	Mean and std. dev.	Pearson correlation coefficients				
		Cost target	Time target	Technical specifications	Quality requirements	Client satisfaction
Cost target	3.56 (0.99)					
Time target	3.65 (0.87)	**0.59**				
Technical specifications	3.86 (0.87)	**0.35**	**0.36**			
Quality requirements	3.60 (0.86)	0.15	0.18	**0.44**		
Client satisfaction	3.95 (0.69)	**0.45**	**0.43**	**0.49**	**0.38**	
Business objectives	4.04 (0.74)	**0.44**	**0.58**	**0.49**	**0.42**	**0.56**

Bold values: significant at $p < 0.0001$ level.

4.1. Project management approach—is it rational adaptive?

The first hypothesis is that the nature of the SPCs in PM will reflect the rational adaptive approach observed in terms of strategic planning in other fields. A high correlation was found between these different planning dimensions similar to previous observations in strategic management, SISP, and SMP research (Table 5). The scatterplot shown in Fig. 1 demonstrates that organizations do not have a purely rational approach to PM (lower right quadrant) nor a purely adaptive approach (upper left quadrant). Rather, the approach is some degree of rational adaptive PM, supporting the first hypothesis. In addition, these characteristics move together, forming a gestalt effect as has been previously noted with respect to strategic planning systems (Papke-Shields et al., 2002; Segars et al., 1998).

4.2. Is a rational adaptive approach to project management beneficial?

The second hypothesis reflects the expectation that a more rational adaptive approach to PM is associated with greater project success. To test this relationship, a categorical measure of the degree of "rational adaptiveness" was used. A factor score was determined for each of the SPC constructs and used as the weight to calculate a "rational adaptive index." The sample was then divided into three groups based on this index. Responses with an index below 9.70 were deemed "low rational adaptiveness," those between 9.70 and 10.80 were deemed "moderate," and those above 10.80 were deemed "high rational adaptiveness".

Once the "rational adaptiveness" groups had been formed, MANOVA was used to determine if a significant difference exists between organizations in the low and high rational adaptive PM groups for all success dimensions as a set. If significant, the univariate results could be used to evaluate each success dimension individually. Before completing that step, however, the presence of multicollinearity among the dimensions of success was evaluated. The results indicate that multicollinearity among the success dimensions was not an issue (variance inflation factors between 1.38 and 2.02, well below the cutoff of 10, and tolerances between 0.50 and 0.72, well above the cutoff of 0.1).

The MANOVA results indicate that there is a significant difference between organizations with a low and high rational adaptive PM approach for the set of project success dimensions as a whole (Table 6, Project Success MANOVA). Univariate results suggest that this is due to significant differences for four dimensions of success—meeting time goals, meeting quality requirements, client satisfaction and achieving business objectives—but not meeting cost goals and meeting technical specifications. Although meeting cost goals and meeting technical specifications were not significantly different, the difference was relatively large and in the expected direction. These results provide support for the second hypothesis.

Table 5
Strategic planning characteristics applied to project management.

Planning dimension	Mean and std dev	Pearson correlation coefficients		
		Formality	Comprehensiveness	Intensity
Formality	3.50 (0.75)			
Comprehensiveness	3.16 (0.72)	**0.51**		
Intensity	3.72 (0.66)	**0.46**	**0.44**	
Participation	3.56 (0.66)	**0.66**	**0.59**	**0.58**

Bold values: significant at the $p < 0.0001$ level.

4.3. Is a rational adaptive approach to project management associated with greater use of PM practices?

The third hypothesis posits that the use of PM tools/techniques will be more prevalent in organizations that employ a more rational adaptive approach to PM. This hypothesis was tested in the same way as the project success hypothesis. No evidence of multicollinearity was found for the PM practices (variance inflation factor well below 10 and tolerance well above 0.10). The multivariate and univariate results show that, as a group, use of PM practices differed based on the degree of rational adaptiveness (Table 6, PM Practices). When examined individually, the use of each of the PM practices, except for procurement, differed significantly between the low and high rational adaptive PM groups.

To gain even more insight, the correlation between each PM practice and each SPC was also examined (Table 7). Given the number of relationships examined, a Bonferroni correction was used to control for the experiment-wide Type I error. Although not every relationship was significant, twenty out of thirty-six correlations were significant at the $p \leq 0.05$ level and an additional three were significant at the $p \leq 0.10$ level. These results provide support for the third hypothesis that organizations with a more rational adaptive PM approach also use PM tools/techniques at a higher rate.

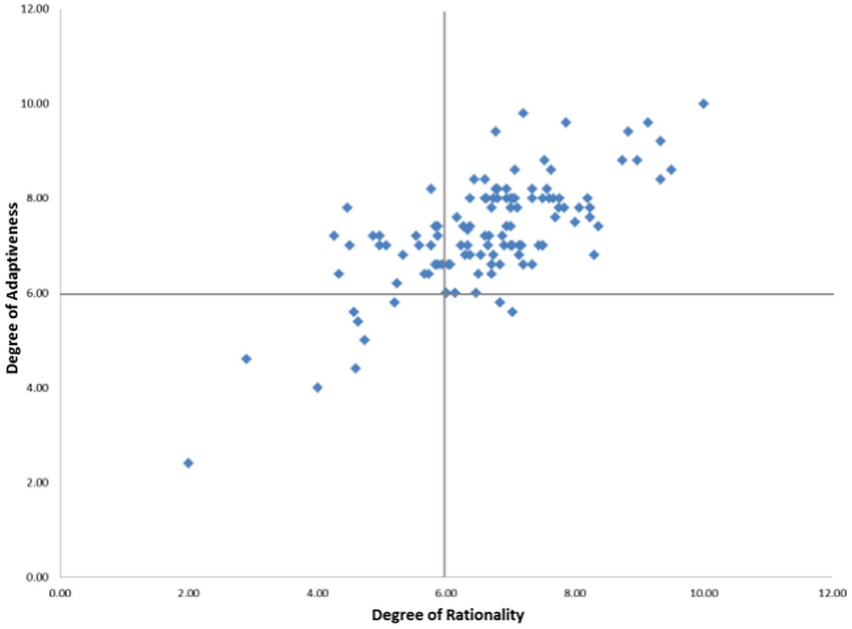

Fig. 1. Rational versus adaptive characteristics in project management.

5. Discussion

This study was undertaken to determine if the SPCs identified in strategic management, SISP, and manufacturing strategic planning are applicable in a project environment and capture at least some aspect of the PM approach used in organizations. In addition, this study assesses whether the rational adaptive approach in a project context replicates the positive association with success observed in other fields. Examination of the use of SPCs in a PM context is not only a natural fit, it also heeds the call to incorporate theory from more established fields into PM research. Prior PM research has captured some aspects of the degree of formality, comprehensiveness, participation, and intensity, but none has captured them consistent with strategic planning research.

A central question of this investigation is whether the combination of these four characteristics reflects the actual adoption of a rational adaptive approach. The lack of purely rational or adaptive planning approaches in the sample (Fig. 1), and significant correlations between the SPCs (Table 5) provide clear support for a hybrid PM approach that varies from "not rational adaptive" to "highly rational adaptive," which is consistent with prior research addressing SISP/SMP. This idea has been proposed in the PM literature (e.g., Patanakul and

Table 6
MANOVA and univariate results for differences between rational adaptiveness groups.

Dependent variables	Rational adaptiveness		
	Low (N = 40)	High (N = 44)	Difference
Project success: MANOVA	Pillai's trace value = 0.2844 (Prob > F = 0.0003)		
Meeting cost goals	3.34	3.79	0.45
Meeting time goals	3.26	4.07	**0.81**
Meeting technical specification	3.66	4.08	0.42
Meeting quality requirements	3.39	3.85	**0.46**
Achieving client satisfaction	3.66	4.10	**0.44**
Achieving business objectives	3.80	4.24	**0.44**
PM practices: MANOVA	Pillai's trace value = 0.3704 (Prob > F = 0.0001)		
Integration	3.09	3.68	**0.59**
Scope	3.36	4.07	**0.71**
Cost	3.14	3.78	**0.64**
Time	3.98	4.34	**0.36**
Quality	2.53	3.39	**0.86**
Human resources	3.02	3.57	**0.55**
Communication	2.50	3.31	**0.81**
Risk	2.34	3.27	**0.93**
Procurement	3.01	3.41	0.40

Bold values: significant at $p < 0.01$ level.

Table 7
Correlation between individual planning characteristics and use of PM practices.

PM practice	Strategic planning characteristics			
	Formality	Comprehensiveness	Participation	Intensity
Integration	**0.39**	**0.30**	*0.27*	0.13
Scope	**0.47**	**0.30**	**0.39**	**0.31**
Time	**0.30**	0.10	0.24	**0.30**
Cost	**0.32**	0.18	0.23	0.20
Quality	**0.42**	**0.35**	**0.36**	*0.28*
Communication	**0.46**	**0.37**	**0.33**	0.19
Human Resources	**0.38**	**0.31**	*0.28*	0.18
Risk	**0.51**	**0.33**	**0.36**	0.20
Procurement	0.18	0.19	0.18	0.20

Bold values: Pearson correlation coefficient significant at Bonferroni corrected $p \leq 0.05$ level.
Italicized values: Pearson correlation coefficient significant at Bonferroni corrected $p \leq 0.10$ level.

Shenhar, 2012; Rostaldås, 2008), and the current results are consistent with findings by Tasevska et al. (2014), who observed a high level of formality, comprehensiveness, and participation in project planning as part of the "business case" construct.

This study also assesses whether a more rational adaptive PM approach is associated with greater project success. Multivariate and univariate analyses of groups exhibiting different levels of rational adaptive planning support this hypothesis (Table 6). When each dimension of success is examined individually, a more rational adaptive approach is associated with greater success on all dimensions except "meeting cost goals" and "technical specifications." One possible explanation for the lack of significant difference in meeting cost goals may be that decisions relating to project budgets are more likely to be influenced by external stakeholders (Hallman and Keizer, 1994), so the approach used by the project team may not have as much of an effect. The lack of significant difference between the low and high rational adaptive groups in meeting technical specifications may be due to external factors such as technology advances, which could be more influential in terms of meeting technical specifications than the PM approach. Each of these relationships raises interesting questions for future research to obtain a better understanding of these results.

Finally, the relationship between PM approach and use of tools/techniques (as PM practices such as integration, scope, time, etc.) was evaluated using the rational adaptive groups. As expected, the results indicate a significant difference between the set of PM practices as a whole across varying degrees of rational adaptive planning (Table 6). Univariate results show that significant differences exist between the low and high rational adaptive PM groups for all PM practices except for the procurement group, providing very strong support for the third hypothesis. One possible explanation for the last finding is that many organizations manage procurement as an independent process, limiting project team member involvement and adaptation of procurement protocols (Indelicato, 2015).

To obtain a more granular view, correlations between each SPC and each PM practice were examined (Table 7) (given multivariate and univariate results, procurement is excluded from this discussion).

- *Formality*: Formality reflects the structured nature of planning by policies, procedures, and written documentation. PM standards in the PMBOK® Guide that includes use of specific tools and written documentation. Thus, this relationship was expected to not only be significant and positive, but to also be the strongest among the SPCs. That time and cost practices have a lower correlation than the other practices may reflect increased attention to PM practices outside of the long-established triple-constraints (Besner and Hobbs, 2006; Papke-Shields et al., 2010).
- *Comprehensiveness and Participation*: The results for use of tools/techniques and these two SPCs are essentially the same with no significant relationship between each of them with cost and time practices. One possible explanation could be that project managers' "training, experience, and comfort with these traditional dimensions" leads to limited identification and evaluation of options as well as participation (Papke-Shields et al., 2010 p. 659). PM practices related to scope, quality, communication, and risk are generally more open-ended, potentially benefitting from increased participation and diverse input. A structured approach to evaluating alternatives in these areas would be more imperative given the variety of options available (Rostaldås et al., 2014).
- *Intensity*: This SPC resulted in the fewest significant relationships, which is somewhat counter-intuitive. This result combined with the formality observed in each area implies that tools/techniques are being used initially but several decisions are not necessarily being revisited. One area related to greater intensity is project scope, which makes sense since organizations continue to monitor and adjust scope over time to avoid scope creep (Papke-Shields et al., 2010).

6. Limitations and future research

Several limitations exist in this study. Four commonly referenced strategic planning characteristics examined in a number of fields were included in this study; however, this is not an exhaustive list. The opportunity to expand the SPCs to include others from strategic planning as well as identify some that are more specific to PM exists. The counter-intuitive results with respect to intensity are also a source of future research in trying to understand how the reported intensity is achieved. Could it be that tools/techniques other than the ones included in this study are being used?

A second limitation is the sample size, which was sufficient for the statistical tests performed to examine the relationships in this study but was not sufficient to establish causality. Causality, if it exists, would provide a clearer picture of the relationship between the rational adaptive approach and PM tools/techniques—does taking a more comprehensive approach lead to the use of certain tools/techniques or does the use of those tools/techniques facilitate comprehensiveness in decision making?

A third limitation is the sample, which comes from one geographic region so it may be more homogeneous in terms of the approach. While this is advantageous because it may reduce the effect of potential extraneous variables, it may also limit the generalizability of the results. Similar findings from prior studies in other fields using data from disparate geographic regions support the relationship of PM approach and success, providing evidence that a rational adaptive PM approach may, in practice, be widely applicable.

With the introduction of SPCs in the project context, there are numerous opportunities for future research. What other tools/techniques that would enhance the understanding of the rational adaptive approach? Given increasing use of agile PM, is the rational adaptive approach applicable? Conforto et al. (2010) observed benefits of simple, iterative, visual, and agile techniques along with more "traditional" PM best practices such as standardization that reflect a rational adaptive approach. Another area to examine is the relationship between a rational

adaptive approach and use of project software—specifically, is a rational adaptive approach embedded in current PM software or could it be in the future? Aspects of formality are already found in project software, but could intensity be built into PM software such as using alerts to trigger increased monitoring?

7. Conclusion

The field of PM has been evolving for decades. Although there are indications of improvement in terms of project success, there are still high rates of failure reported and thus a continued interest in identifying what contributes to project success. This study contributes to this line of research by identifying a PM approach and relating this approach to enhanced project success. But the current study differs from many before it in two ways: (1) a more generalized approach is examined, and (2) it is based on theory from strategic planning research, as recommended by a number of researchers in the PM field.

Using planning characteristics identified as important in the strategic planning literature, this study demonstrates the presence of a rational adaptive approach to PM that combines formality and comprehensiveness associated with rational planning with participation and intensity associated with adaptive planning. It differs from prior work as the rational adaptive approach in a project context broadens understanding of what contributes to a successful project compared to the focus on specific PM methods or tools/techniques that have been examined in the past. This reflects Leybourne's (2007) discussion about the evolution of PM research. Segars et al. (1998, p. 303) argued that focusing on specific frameworks, methodologies, or tools, as had been done for SISP, resulted in a narrow focus while "planning activities in organizations can be more accurately conceptualized as systems of behaviors, agendas, or process dimensions." The strong relationship between many tools/techniques and the rational adaptive approach lends credibility to the approach since these tools/techniques have been a mainstay in project management. The rational adaptive approach also reflects CSFs under the control of the project team, avoiding those CSFs external to the project environment.

The findings of this study contribute to the field of PM both in terms of research and practice. The inclusion of SPCs from strategic planning in other fields provide opportunities for future research in this area as well as an example of adapting theory from more established fields to advance PM research. From a practitioner's perspective and as Segars et al. (1998) discussed, the set of steps found in the prescriptive PM methods in the past tended to be somewhat rigid and may or may not work well in a specific organization (Svejvig and Andersen, 2015). Given the relationship between the rational adaptive approach and the use of tools/techniques that are already established in most organizations, a more generalized approach allows practitioners to and manage projects in ways that improve implementation and enhance successful outcomes.

Conflict of interest

There is no conflict of interest.

References

A Guide to the Project Management Body of Knowledge (PMBOK® Guide), 2008. Project Management Institute, Newtown Square, PA.
Allen, M., Alleyne, D., Farmer, C., McRae, A., Turner, C., 2014. A framework for project success. J. Inf. Technol. Econ. Dev. 5 (2), 1–17.
APM Body of Knowledge, 2006. fifth ed. APM Publishing, Buckinghamshire.
Armstrong, J., Overton, T., 1977. Estimating nonresponse bias in mail surveys. J. Mark. Res. 14 (3), 396–402.
Atkinson, R., 1999. Project management: cost, time and quality, two best guesses and a phenomenon, it's time to accept other success criteria. Int. J. Proj. Manag. 17 (6), 337–342.
Besner, C., Hobbs, B., 2006. The perceived value and potential contributions of project management practices to project success. Proj. Manag. J. 37 (3), 37–48.
Borman, M., Janssen, M., 2013. Reconciling two approaches to critical success factors: the case of shared services in the public sector. Int. J. Inf. Manag. 33 (2), 390–400.
Camillus, J.C., 1982. Reconciling logical incrementalism and synoptic formalism: an integrated approach to designing strategic planning processes. Strateg. Manag. J. 3 (3), 277–283.
CHAOS report, 1994-2014, The Standish Group, d. http://www.standishgroup.com (accessed 7/24, 2015).
Conforto, E., Amaral, C., Capaldo, D., 2010. Evaluating an agile method for planning and controlling innovative projects. Proj. Manag. J. 41 (2), 73–80.
Cooke-Davies, T., 2002. The 'real' success factors on projects. Int. J. Proj. Manag. 20 (3), 185–190.
Crawford, L., 2005. Senior management perceptions of project management competence. Int. J. Proj. Manag. 23 (1), 7–16.
Crawford, L., Pollack, J., 2007. How generic are project management knowledge and practice? Proj. Manag. J. 18 (1), 87–96.
Das, S.R., Zahra, S.A., Warkentin, M.E., 1991. Integrating the content and process of strategic MIS planning with competitive strategy. Decis. Sci. 22 (5), 953–984.
Drouin, N., Jugdev, K., 2014. Standing on the shoulders of strategic management giants to advance organizational project management. Int. J. Manag. Proj. Bus. 7 (1), 61–77.
Dvir, D., Raz, T., Shenhar, A.J., 2003. Án empirical analysis of the relationship between project planning and project success. Int. J. Proj. Manag. 21 (1), 89–95.
Fortune, J., White, D., Judgev, K., Walker, D., 2011. Looking again at current practice in project management. Int. J. Manag. Proj. Bus. 4 (4), 553–572.
Fredrickson, J.W., Mitchell, T.R., 1984. Strategic decision processes: comprehensiveness and performance in an industry with an unstable environment. Acad. Manag. J. 27 (2), 399–423.
Gowan, J., Mathieu, R., 2005. The importance of management practices in IS project performance: an empirical study. J. Enterp. Inf. Manag. 18 (1/2), 235–255.
Hallman, J.I.M., Keizer, J.A., 1994. Diagnosing risks in product-innovation projects. Int. J. Proj. Manag. 12 (2), 75–80.
Hart, S.L., 1992. An integratie framework for strategy-making processes. Acad. Manag. Rev. 17 (2), 327–352.
Ibbs, C., Kwak, Y., 2000. Assessing project management maturity. Proj. Manag. J. 31 (1), 32–43.
Indelicato, G., 2015. Review of procurement project management success: achieving a higher level of effectiveness by Lindstrom, D. Proj. Manag. J. 46 (4), e3.
Jugdev, K., Perkins, D., Fortune, J., White, D., Walker, D., 2013. An exploratory study of project success with tools, software and methods. Int. J. Manag. Proj. Bus. 6 (3), 534–551.
Killien, C.P., Jugdev, K., Drouin, N., Petit, Y., 2012. Advancing project and portfolio management research: applying strategic management theories. Int. J. Proj. Manag. 30 (5), 525–538.

Lederer, A.L., Sethi, V., 1996. Key prescriptions for strategic information systems planning. J. Manag. Inf. Syst. 13 (2), 35–62.
Leybourne, S.A., 2007. The changing bias of project management research: a consideration of the literatures and an application of extant theory. Proj. Manag. J. 38 (1), 61–73.
Ling, F., Low, W., Wang, S., Lim, H., 2009. Key project management practices affecting Singaporean firms' project performance in China. Int. J. Proj. Manag. 27 (1), 59–71.
Lorange, P., Vancil, R.F., 1977. Strategic Planning Systems. Prentice Hall, Englewood, NJ.
McKinsey and Company, 2012. http://www.mckinsey.com/insights.
Meissner, P., 2014. A process-based perspective on strategic planning: the role of alternative generation and information integration. Bus. Res. 7 (1), 105–124.
Milosevic, D., Patanakul, P., 2005. Standardized project management may increase development project success. Int. J. Proj. Manag. 23 (2), 181–192.
Mintzberg, H., 1987. Crafting strategy. Harv. Bus. Rev. 65 (4), 173–179.
Papke-Shields, K.E., Malhotra, M., Grover, V., 2002. Strategic manufacturing planning systems and their linkage to planning system success. Decis. Sci. 33 (1), 1–30.
Papke-Shields, K., Beise, C., Quan, J., 2010. Do project managers practice what they preach, and does it matter to project success? Int. J. Proj. Manag. 28 (7), 650–662.
Parker, D.W., Parsons, N., Isharyanto, F., 2015. Inclusion of strategic management theories to project management. Int. J. Manag. Proj. Bus. 8 (3), 552–573.
Patanakul, P., Shenhar, A., 2012. What project strategy really is: the fundamental building block in strategic project management. Proj. Manag. J. 43 (1), 4–20.
PM Guide 2.0, 2010. Guideline for the Certification of Project Managers. International Association of Project Managers, Vaduz, Liechtenstein.
Rostaldås, A., 2008. Applied Project Management – How to Organize, Plan and Control Projects. Tapir Academic Press, Trondheim.
Rostaldås, A., Rommelein, I., Schiefloe, P.M., Ballard, G., 2014. Understanding project success through analysis of project management approach. Int. J. Manag. Proj. Bus. 7 (4), 638–660.
Segars, A.H., Grover, V., Teng, J.T.C., 1998. Strategic information systems planning: planning system dimensions, internal coalignment and implications for planning success. Decis. Sci. 29 (2), 303–345.
Serrador, P., Turner, R., 2015. The relationship between project success and project efficiency. Proj. Manag. J. 46 (1), 30–39.
Shenhar, A., Dvir, D., 2007. Reinventing Project Management: The Diamond Approach to Successful Growth and Innovation. Harvard Business School Press, Watertown, MA.
Shenhar, A., Levy, O., Dvir, D., 1997. Mapping the dimensions of project success. Proj. Manag. J. 28 (2), 5–13.
Shenhar, A., Dvir, D., Levy, O., Maltz, A., 2001. Project success: a multidimensional strategic concept. Long Range Plan. 34 (6), 699–725.
Smyth, H., Morris, P., 2007. An epistemological evaluation of research into projects and their management: methodological issues. Int. J. Proj. Manag. 25 (4), 423–436.
Sridhar, V., Nath, D., Malik, A., 2009. Analysis of user involvement and participation on the quality of IS planning projects: an empirical study. J. Organ. End User Comput. 21 (3), 80–98.
Svejvig, P., Andersen, P., 2015. Rethinking project management: a structured literature review with a critical look at the brave new world. Int. J. Proj. Manag. 33 (2), 278–290.
Swink, M., Talluri, S., Pandejpong, T., 2006. Faster, better, cheaper: a study of NPD project efficiency and performance tradeoffs. Int. J. Proj. Manag. 17 (6), 337–342.
Tasevska, F., Damij, T., Damij, N., 2014. Project planning practices based on enterprise resources planning systems in small and medium enterprises – a case study from the republic of Macedonia. Int. J. Proj. Manag. 32 (3), 529–539.
Thomas, G., Fernandez, W., 2008. Success in IT projects: a matter of definition? Int. J. Proj. Manag. 26 (7), 733–742.
Turner, R., Zolin, R., 2012. Forecasting success on large projects: developing reliable scales to predict multiple perspectives by multiple stakeholders over multiple time frames. Proj. Manag. J. 43 (5), 87–99.
White, D., Fortune, J., 2002. Current practices in project management – an empirical study. Int. J. Proj. Manag. 20 (1), 1–11.
Yalegama, S., Chileshe, N., Ma, T., 2016. Critical success factors for community-driven development projects: a Sri Lankan community perspective. Int. J. Proj. Manag. 34 (4), 643–659.
Zwikael, O., Globerson, S., 2004. Evaluating the quality of project planning: a model and field results. Int. J. Prod. Res. 42, 1545–1556.
Zwikael, O., Globerson, S., 2006. From critical success factors to critical success processes. Int. J. Prod. Res. 44 (17), 3433–3449.