



International Journal of Project Management 30 (2012) 162-175



## The effects of Project Management Information Systems on decision making in a multi project environment

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Received 15 September 2010; received in revised form 11 May 2011; accepted 31 May 2011

#### Abstract

Project Management Information Systems (PMIS) should provide project managers with decision making support for planning, organizing and controlling projects. Most project managers are dissatisfied with the information produced by PMIS. Based on a survey among 101 project managers the interactions between six factors related to PMIS information quality and usage and their effect on decision making are examined in a multi project environment. Using structural equation modeling, new insights were gained in these complex relationships. Results indicate that the use of a project management information system is advantageous to project managers, while no adverse effects were observed due to project and information overload. PMIS information quality is positively related to quality of the decisions, satisfaction of project managers with PMIS and use of PMIS information. Simultaneous handling of multiple projects causes project managers to extend conclusions about the information quality for one project to all projects at hand.

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Keywords: Project management; Information systems; Multi project environment

#### 1. Introduction

The current business environment is complex. Managers need to make fast decisions, allocate scarce resources efficiently, and have a clear focus. In organizations that are engaged in many projects simultaneously, management is faced with multiple challenges (Elonen and Artto, 2003). Project managers handling different projects with different scopes, complexities and timelines face particular problems. These can be related to resource conflicts and throughput times (Maylor et al., 2006; Platje and Seidel, 1993). Inadequate balancing of scarce resources often results in additional pressure on the organization, which leads to poor quality of information and longer lead times of projects (Elonen and Artto, 2003). Interdependencies and interactions between projects (Patanakul and Milosevic, 2008b)

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and information and project overload (Engwall and Jerbrant, 2003; Zika-Viktorsson et al., 2006) present specific challenges as well. Managers may become overwhelmed by the amount of information that is available for decision making, losing sight of relevant information or being unaware of inaccuracies.

In general, poor information quality leads to poor decision making (Blichfeldt and Eskerod, 2008; Elonen and Artto, 2003; Engwall and Jerbrant, 2003). The use of *Project Management Information Systems* (PMIS) is considered advantageous to project managers because of the alleged contribution regarding timelier decision making and project success (Raymond and Bergeron, 2008). The implementation of PMIS in a multi project environment may help to accomplish a realistic project assignment, which is an effective strategy when managing multiple projects (Patanakul and Milosevic, 2008a).

Studies on the use of PMIS have predominantly focused on single projects with high complexity, and PMIS are considered advantageous in such environments (Raymond and Bergeron, 2008). Project managers who deal with single projects that are less complex may not be willing to use PMIS, because the time they

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have to invest in keeping the system up to date may exceed the benefits gained from utilizing the system (Ali and Money, 2005; Bendoly and Swink, 2007). However, little research has been done to find out whether project managers handling multiple but less complex projects benefit from PMIS. The objective of our study is to gain better understanding of the elements of PMIS that contribute to adequate decision making in a multi project environment, and to provide insights in the relationship between PMIS information quality and the project manager's satisfaction with PMIS.

In this study we define a multi project environment as a setting in which project managers are in charge of several (more than one) projects on the operational level at the same time (see also Zika-Viktorsson et al. (2006) for characteristics of a multi project setting). Hence, a project manager simultaneously supervises several teams performing product development work according to a project specific delivery plan. Multi project managers allocate resources to various projects on a short term basis in an attempt to achieve maximum progress for each project. Multi project management differs from project portfolio management. Whereas portfolio managers have projects that are strategically related, the projects of a multi project manager might be related on a strategic level, but projects might also be independent strategically, and only share scarce time and resources with other projects (Dye and Pennypacker, 2000).

Concrete, this study is of an empirical nature and aims to identify and quantify the effects of PMIS information use on decision making in a multi project environment, as perceived by project managers. PMIS information use is seen as a function of PMIS satisfaction and the quality of PMIS information. On the basis of a survey among 91 project managers in a multinational pharmaceutical company this study will provide insights in the problems that project managers encounter in a multi project environment, namely: (1) The extent to which PMIS information quality is perceived by project managers to contribute to enhanced decision making in a multi project environment. PMIS information quality reflects whether the information generated by the PMIS is perceived to be readily at one's disposal (available); sound and dependable (reliable); closely connected or appropriate to the matter in hand (relevant); correct in all details (accurate) and understandable (comprehensible) (O'Reilly, 1980; Zmud, 1978). (2) The extent to which project overload and information overload is perceived by project managers to influence the quality of PMIS information.

The organization of the paper is as follows. The next section will review the literature about project management, PMIS and the factors that influencing decision making in a multi project environment. This section will also introduce the research model. Subsequently, we present the research methodology. Then, the results are reported, followed by the discussion and conclusion, and limitations and issues for further research.

#### 2. Literature review

#### 2.1. (Multi) project management

Project management "covers all project management processes that are related to planning, controlling, and coordinating projects" (Ahleman, 2009: 19–20). Project management is an intricate task regarding the complexity, uncertainties and large number of activities involved, even in a single project environment (Mota et al., 2009). In a multi project environment it is common that one project manager leads multiple concurrent projects at the same time (Patanakul and Milosevic, 2008a).

Issues related to (multi) project management are addressed in many studies, see Table 1 for an overview. Empirical studies regarding (multi) project management have largely focused on resource allocation issues (Blichfeldt and Eskerod, 2008; Hendriks et al., 1999; Laslo and Goldberg, 2008; Payne, 1995), managerial problems in the form of delayed projects, stress and lack of overview (Blichfeldt and Eskerod, 2008), differences between single and multi project environment (Aritua et al., 2009), projectification and programmification (Maylor et al., 2006), and planning and control (Dvir et al., 2003; Platje et al., 1994; Platje and Seidel, 1993; Turner and Speiser, 1992). All these studies have in common that they

Table 1 Overview of studies on project management and PMIS.

References	Studied areas									
	Single project management									
	2. Multi project management									
	3. PMIS 4. Project overload									
	5. Information overload									
	6. Information quality									
	7. Satisfaction with IS  8. IS use  9. Decision making									
Ahlemann (2009)			X							
Ali and Money (2005)	X					X	X	X		
Ali et al. (2008)	X					X	X	X		
Aritua et al. (2009)		X								
Atkinson (1999)	X									
Blichfeldt and Eskerod (2008)		X								
Cooper et al. (2001)		X				X			X	
DeLone and McLean (2003)						X	X	X		
Dietrich and Lehtonen (2005)	X	X				X			X	
Dvir et al. (2003)	X									
Engwall and Jerbrant (2003)		X		X						
Hendriks et al. (1999)	X								X	
Laslo and Goldberg (2008)	X	X								
Martinsuo and Lehtonen (2007)		X							X	
Maylor et al. (2006)		X								
Mota et al. (2009)	X	X							X	
O'Reilly (1980)					X					
Patanakul and Milosevic (2008a)		X								
Patanakul and Milosevic (2008b)		X								
Payne (1995)		X								
Platje and Seidel (1993)		X								
Platje et al. (1994)		X								
Raymond and Bergeron (2008)	X		X			X		X	X	
Saeed and Abdinnour-Helm (2008)			X			X			X	
Seddon and Kiew (1994)						X	X	X		
Turner and Speiser (1992)		X								
Zika-Viktorsson et al. (2006)		X		X						

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