



Critical success factors in projects

CSFs in projects

Pinto, Slevin, and Prescott – the elucidation of project success

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Abstract

Purpose – Few scholars have been cited as frequently as Pinto, Slevin, and Prescott for their contributions to project success and related critical success factors (CSF) in the 1980s. Studies since then built on their articles to broaden and refine our understanding of the topic. The purpose of this paper is to discuss the reasons for the impact of these seminal contributions and how the topic of project success continues to evolve.

Design/methodology/approach – The paper analyses the popularity of Pinto and his colleagues' contributions to project success and reviews the development of this field of research since then.

Findings – Project success remains a vibrant school of thought as do the earlier definitions, measurement scales and dimensions, and assessment techniques that Pinto and his colleagues developed. The authors view success more broadly and think of it strategically because they consider longer-term business objectives. Some research is now based on managerial or organizational theories and reflects the multi-dimensional and networked nature of project success.

Practical implications – Practically, the classic contributions in project success continue to be valid. The authors see diversity in how success is defined and measured. The CSFs vary by project types, life cycle phases, industries, nationalities, individuals, and organizations.

Originality/value – The paper relates earlier understandings of project success to subsequent research in the field and underscores the significant findings by Pinto, Slevin, and Prescott.

Keywords Critical success factors, Project management, Project success, Success measures, Theory development

Paper type Literature review

1. Introduction

Isaac Newton once said “If I have seen a little further it is by standing on the shoulders of Giants”. The research community was mindful of this when considering project success. The field of project management has evolved in part because researchers have stood on the shoulders of such giants as Pinto, Slevin, and Prescott since their seminal contributions to the field in the 1980s. As the editors of this special issue noted, history is important and it is prudent for us to remember that when some concepts are raised as novel, they were actually brought to our attention years ago. In essence, history matters.

The authors would like to acknowledge the generous support in kind from their respective universities – BI Norwegian Business School, Norway and Athabasca University, Canada.



The subject of project success is at the heart of project management. Many factors impact the degree of project success. Project success is therefore among the top priorities of project managers and project stakeholders. It is not surprising then that the topic has interested academics and practitioners for decades and continues to be of relevance today.

The project management literature frequently refers to two components of project success (Authors; Morris and Hough, 1987; Wateridge, 1998; Turner, 1999):

- (1) *Project success factors*, which are the elements of a project which, when influenced, increase the likelihood of success; these are the independent variables that make success more likely.
- (2) *Project success criteria*, which are the measures used to judge on the success or failure of a project; these are the dependent variables that measure success.

The popularity of project success is evident in the high citation rates on certain papers on the topic. Appendix 1 exemplifies a list of the top refereed journal articles with project success in the title and with over 100 citations (Google.scholar, as of December 2011). This top 15 list span the 1988-2011 timeframe. An amazing 2,790 citations for this period indicates the ongoing interest by scholars in the subject. Two of the 15 papers (13 percent) were by Pinto and his colleagues. 53 percent of the papers were in the top two project management journals (six of the 15 papers were in the *Project Management Journal* and two were in the *International Journal of Project Management*).

One of the reasons for the interest in success is evident in Pinto and Slevin's (1988b) article on the definition and measurement of project success: "There are few topics in the field of project management that are so frequently discussed and yet so rarely agreed upon as that of the notion of project success" (Pinto and Slevin, 1988b, p. 68).

This article is about the seminal work of Pinto, Slevin, and Prescott in identifying project success factor and project success criteria. It is positioned as an overview of the impactful work of these three researchers and the developments thereafter in the realm of project success and its relationship to corporate success. To that end, this article does not redefine project success and the difference between success and success criteria, but highlights the contributions of researchers to the developments in the subject area. The paper provides a conceptual overview of some of the key understandings of the subject as of today and provides a platform for others in the field to continue to build upon.

This paper begins with a brief overview of project success as positioned in the schools of thought. Then, we present an overview of seminal papers by Pinto, Slevin, and Prescott that date back to the late 1980s. Thereafter, we examine the related developments since that time to identify the growing scope and diversity of the project success literature and its impacts on the field. Following this, we explore some of the more recent developments that help extend our collective understanding project success and critical success factors (CSF). We conclude with some suggestions for future research.

2. The early giants of project success: Pinto, Slevin, and Prescott

Interest in the topic of project success is evident in the streams of research that identify "schools" or "perspectives" in the field. In 1995, project management was described as involving two streams of research – one was the optimisation school that looks at work breakdown structures for the division of labour and network planning techniques for integrating tasks and the other school was the CSF one which examined generic factors on project success (Packendorf, 1995). In 2002, an assessment of the dominant schools

of thought in project management identified seven schools, one of which was the CSF school (Söderlund, 2002). This school primarily looks at the triple constraints of time, cost, and scope and has its roots in the need to address project failure. This approach examines success factors and project outcomes. A 2010 assessment of the literature expanded the list of schools of thought in project management to nine, and project success remained one of the schools (Turner *et al.*, 2010).

The renowned articles by Pinto, Slevin, and Prescott were published in the late 1980s, at a time when projects were starting to become popularized as a way to achieve company objectives. Prior to this, project success was defined diffusely and compatible success factors and project assessment tools were missing. So the contributions of Pinto, Slevin, and Prescott were both timely and also relevant to the field.

However, Pinto and Slevin were not the first to address the subject of success factors. For example, Boynton and Zmud (1984) looked at it in the realm of management information systems and then extended it into other areas. The authors addressed the weaknesses of the CSF approach in terms of difficulty in application, personal bias of those involved, and complexity of modeling the real world accurately. They found that these weaknesses can be overcome through ease of senior managers' acceptance of the CSF approach and the benefits of having a structured top-down analysis of the planning process. In a related article Nutt (1986) looked into implementation tactics of organizational change projects and identified four different approaches being used for implementation, namely intervention (key executives justify the need for change), participation (stakeholder representatives determine change features), persuasion (experts attempt to sell a change they devise), and edict (sponsors issue directives requiring adoption) and hybrids thereof. His study showed that the intervention tactic had 100 percent success rate, followed by participation (84 percent), persuasion (73 percent) and edicts (43 percent).

With Pinto, Slevin, and Prescott not being the first to address this subject the question arises "Why are their contributions so popular?" One reason is that they took a broad and systemic approach to their studies. They methodically concentrated on aspects of project success, such as measuring success or identifying the importance of CSFs. They used a comprehensive approach of defining project success at the outset, identifying the factors which supported success, followed by an assessment of the different weights of these factors over the project life cycle or in different industries. They also developed a tool enabling project managers to assess the status of their projects and compare them with a database of over 400 projects. The combination of these studies and the associated publications provide for a solid foundation and toolset (both intellectually as well as physically) to manage projects towards success.

At this point a few words about Pinto, Slevin, and Prescott may be appropriate. When he published the seminal work in 1988, Dr Jeffrey Pinto was an Assistant Professor at the University of Cincinnati's Management Department with a master degree and two undergraduate degrees (Pinto and Slevin, 1988a). Currently, Dr Jeffrey Pinto is a Professor of Management at Penn State Erie, at the Behrend College. Within the Sam and Irene Black School of Business he holds the Andrew Morrow and Elizabeth Lee Black Chair in Management Technology. Among the many awards he received are the 2009 Research Achievement Award from the Project Management Institute and the 2011 Behrend Council of Fellows Research Award (PSU, 2011).

In 1988, Dr Denis Slevin was an Associate Professor at the University of Pittsburgh, Graduate School of Business with a graduate degree and two undergraduate

degrees (Pinto and Slevin, 1988a). Today he is a Professor of Business Administration at University of Pittsburgh's Joseph M. Katz Graduate School of Business & College of Business Administration. He also holds the Tom W. Olofson Chair in Entrepreneurial Studies (PITT, 2011a).

In 1988, Dr Prescott was an Assistant Professor of Business Administration at the Joseph M. Katz Graduate School of Business, University of Pittsburgh. He held a graduate and undergraduate degree (Pinto and Slevin, 1988b). Today, Dr Prescott is Professor of Business Administration at University of Pittsburgh's Joseph M. Katz Graduate School of Business & College of Business Administration. He also holds the Thomas O'Brien Chair of Strategy (PITT, 2011b). All three academics continue to publish widely in their fields.

2.1 Contributions by the early giants of project success

The following section provides an overview of publications by Pinto, Slevin, and/or Prescott and then analyzes the ways in which these papers formed the foundation for subsequent research in the field.

Throughout their contributions, Pinto, Slevin, and Prescott defined a project similar to the Project Management Institute's definition wherein a project is "a temporary endeavour undertaken to create a unique product or service" (Project Management Institute, 2008, p. 5). In 1987 Pinto and Slevin published their paper on "Critical factors in successful project implementation" (Pinto and Slevin, 1987). In doing so, they were at the forefront of addressing success as a multidimensional concept versus using a single measure. They determined that the CSF of "project mission" was important in all the stages but that some CSFs were common to projects, regardless of project type.

In their 1988 article on "Project success: definitions and measurement techniques" (Pinto and Slevin, 1988b) the authors systematically reconciled the implementation literature on organizational change with that of project management. They developed a framework of project success characteristics. Their success model and measurement scale was developed by overlaying the three implementation dimensions from organizational change (i.e. technical validity, organizational validity, and organizational effectiveness), with those of time, cost, performance and client satisfaction on projects. They also used the success characteristics to develop a project assessment which was based on their earlier project implementation profile (PIP) (Slevin and Pinto, 1986). This 1988 contribution enabled organizations to "benchmark" their projects status against the average assessment results from applying the PIP to more than 400 projects and identify areas for improvement in their own projects.

In their other 1988 article, Pinto and Slevin addressed the "Critical success factors across the project life cycle" (Pinto and Slevin, 1988a). This contribution was an empirical test of the CSFs they developed prior (Slevin and Pinto, 1986). Based on 418 responses to a questionnaire targeted at Project Management Institute® members, the significance and weight of the ten project internal factors (i.e. project mission, top management support, project schedule/plan, client consultation, personnel, technology to support the project, client acceptance, monitoring and feedback, channels of communication, and troubleshooting expertise) were assessed simultaneously with four external CSFs (i.e. characteristics of the project team leader, power and politics, environmental events, and urgency). These 14 factors jointly spanned both the project itself as well as its context, and were thus important for projects and their governance

at the organizational level. All the factors were significantly related to project success. Different combinations of the 14 CSFs explained 60 percent of project success. One single CSF (project mission) was significant for success across all the project stages. The paper concluded with six suggestions for project managers, to help them apply the success factors and thereby increase their chances for successful project delivery.

Another article called “Variations in critical success factors over the stages in the project life cycle” focused on the ten internal CSFs and used a rigorous statistical technique to assess the impact of CSFs on project success by project life cycle stage (Pinto and Prescott, 1988). Thereby the paper provided a more focused assessment of the factors that project managers can influence when managing projects. The authors used Ridge regressions to minimize the effects stemming from multicollinearity among the independent variables. The results showed that different combinations of seven of the originally ten factors related to project success in the four stages of the project life cycle. “Monitoring and feedback”, as well as “communication” were excluded as CSFs because they were found to be unstable through the regressions. The CSF “personnel” was not found to be correlated with project success in any stage of the project life cycle. The contribution of this article was that it enabled project managers to identify specific CSFs to focus on during the project lifecycle.

In their 1990 paper entitled “Planning and tactical factors in project implementation success”, Pinto and Prescott grouped the CSFs into planning and tactical categories (Pinto and Prescott, 1990). Of the ten CSFs, “project mission, top management support, project schedule/plan and client consultation” were placed in the planning category and the rest under tactical. Furthermore, project success was multidimensional and consisted of: “budget and schedule; value; and client satisfaction”. Pinto and Prescott indicated that some factors that contributed to project success were within the project team’s control and that other factors were not as they were environmental.

An interesting question is the linkage between the success factors identified by Pinto and Slevin in 1988 and its reflection within the bodies of knowledge of professional organizations like PMI or APM. The first edition of PMI’s *Guide to the Project Management Body of Knowledge* was published in 1996, that is, eight years after Pinto and Slevin’s seminal work. However, a white paper published by PMI in 1987 (Project Management Institute, 1987), which can be considered the predecessor of this first edition, defines the processes (today known as knowledge areas) as “necessary to achieve the required [function] output” (p. 4-1). The first edition of the *Guide to the Project Management Body of Knowledge* (Project Management Institute, 1996, pp. 1-3) took that further and referred to project success as:

[...] meeting or exceeding stakeholder needs and expectation [...] [by] balancing competing demands among:

- Scope, time, costs, quality.
- Stakeholders with different needs and expectations.
- Identified requirements (needs) and unidentified requirements (expectations).

No reference is made in the later versions of PMI’s PMBoKs (Project Management Institute, 2008) to Pinto and Slevin’s success factors. Conversely, the *Body of Knowledge* of the UK-based Association for Project Management (2000) refers directly to the work of Pinto and Slevin (1988a, b) as CSF, which APM defines as “those measurable factors that,

when present in the project's environment, are most conducive to the achievement of a successful project" (p. 18). Thus, Pinto and Slevin seem to have influenced thinking among academics and practitioners, but not penetrated all the profession's bodies of knowledge.

In summary the combination of the articles by Pinto, Slevin, and Prescott provided a solid foundation for subsequent research. These articles contributed to the field through concise and clear definitions and measurement scales for success factors, and a practical self-assessment tool based on how the concepts were operationalized. They further extended our understanding of CSFs by project stage, CSFs by the planning and tactical categories, and CSFs within the project manager's influence. Their holistic approach in addressing the concept of project success continues to significantly impact our understanding of project success in terms of the concepts of project success and the independent (causes) and dependent variables (effects). Pinto, Slevin, and Prescott's contributions continue to be cited in the current literature on project success and the authors are popularly known for their seminal contributions to the field.

3. Standing on the shoulders of the early giants of project success

3.1 Early periods of project success

An earlier review of the success literature up to 2005 identified four different periods[1] in the development of understanding of project success (Authors). According to that study, Period 1 (1960s-1980s) focused on the project implementation and handover period and defined success in terms of the iron triangle (Pinto and Slevin, 1988b). With the main exception being the contributions by Pinto *et al.*, overall, the literature of this period lacked extensive empirical work (Atkinson, 1999; Belassi and Tukul, 1996; Cooke-Davies, 1990; Hartman, 2000). Near the end of this period, the literature showed a gradual trend towards including client satisfaction as a variable in assessing project success, both at the end of the project life cycle and into the product life cycle (Atkinson, 1999).

In Period 2 (1980s-1990s), the emphasis was on developing CSF lists using anecdotes and single case studies instead of a categorization scheme or framework (Authors). The main exceptions to most of the publications in this period were the ones by Pinto, Slevin, and Prescott as discussed in the prior section. In this period, success was typically described with a single measure for the project instead of multiple measures over the life cycle (e.g. the project was either a success or it was a failure). Early work in this period was mainly based on case studies. Morris and Hough (1987) were among the first to develop a more comprehensive framework on the preconditions of project success, involving the elements of attitudes, project definition, external factors, finance, organization and contract strategy, schedule, communications and control, human qualities, and resources management. They addressed success as involving both subjective and objective dimensions, success as varying across the project and product life cycle, and success as being based on different stakeholder perspectives. Their contribution was noticeable absent in Appendix 1 which we limited to journal papers because they are peer-reviewed.

In Period 3 (1990s-2000s) significant contributions to the CSF school pertained to the emergence of integrated frameworks on project success (Authors). Belassi and Tukul (1996) presented a holistic framework that included within-firm and industry factors. The four categories were factors related to the project, factors related to the project manager and team, factors related to the organization, and factors related to the external environment. The classification enabled readers to clearly see what category certain CSFs belong to, and the classification system allowed for an examination

of CSF interrelationships. The systematic scheme portrayed the relationships between the factors and implications when these factors were not addressed. A key contribution of this kind of framework was that it grouped CSFs along the lines of stakeholder groups.

Our understanding of success as a broader, organizational concept has evolved since the Pinto, Slevin, and Prescott publications. Success continues to be an intriguing word and it continues to have different meanings for different stakeholders in the project context. Views on project success have changed over the years from definitions that were limited to the implementation phase of the project life cycle to current definitions that reflect an appreciation of success over the project and product life cycle. Over the years, the literature has also evolved as demonstrated by the advanced methodologies used. CSFs are used as independent variables to predict project success (in terms of objective measures such as time, cost, and scope, and subjective measures such as satisfaction), and project success serves as an intermediate variable to predict organizational success as the dependent variable.

In the following section we examine some of the above contributions to the field of project success and other influential studies of the past decade.

3.2 Factors impacting success

We structure this section by studies on factors impacting success, the measurement of success, and the relative importance assigned to different aspects of success.

Our December 2011 analysis of citation rates in the Thomson Reuters (formerly ISI) Web of Knowledge database, reflects the popularity of papers from outside the mainstream project management journals (Appendix 2). We conducted this analysis because the main journals, like *International Journal of Project Management*, *Project Management Journal*, and *International Journal of Managing Projects in Business* are either not part of or were only recently accepted by the Web of Knowledge. From the Web of Knowledge, the papers by Hoegl and Gemünden (2001), as well as Pinto and Slevin (1987) clearly lead the list in terms of number of citations. These are followed by the papers by Shenhar and Dvir (1996) and Pinto and Mantel (1990).

Gemünden made some significant contributions to the CSF school (Gemünden *et al.*, 2005; Hoegl and Gemünden, 2001; Ritter and Gemünden, 2004). The majority of his contributions pertain to CSFs of technology and innovation management projects. Hoegl and Gemünden (2001) advanced research on the CSF school through their empirical paper on teamwork quality contributing to the success of innovative projects in the software development field. Their paper built on the theoretical contributions by Pinto *et al.*, and it was based on the extant work primarily within organizational theory. Their conceptual diagram used teamwork quality as a predictor of two types of project success – team performance (efficiency and effectiveness) and personal success (satisfaction and learning). Another study examined innovation success in terms of product and process within the engineering sector (Ritter and Gemünden, 2004). In this study the authors developed clear ties to strategic management theory at the firm level and industry levels of success (competitive advantage) because they addressed both core competences (resource based view of the firm from strategic management) and inter-firm collaborations. Ritter and Gemünden developed and empirically tested their model based on business strategy predicting technological competence and network competence which then predicted innovation success.

Gemünden, Salomo, and Krieger also studied innovative new product development projects to examine the influence that project autonomy had on project success (Gemünden *et al.*, 2005). Project autonomy involved structural, resource, and locational autonomy. Project success was assessed by project phase (using the triple constraint) and success was measured in terms of internal success (technical success, competence gains, and meeting target costs) as well as external success (financial success, meeting market shares, image, and regulatory requirements). The findings showed that co-locating team members contributed to significant positive effects on project innovativeness. Their paper challenged the traditional use of new product development instruments and supported the use of instruments from the organizational behaviour field because these instruments allow for a better assessment of the concepts in question. Overall, Gemünden, Hoegl and their colleagues were instrumental in emphasizing that CSFs be assessed in terms of the firm and environment as per the competitive advantage field.

A further step for refinement of the understanding of project success factors was taken by Shenhar *et al.* (2002), by identifying general and project specific success factors. Their study showed that 96 different variables are relevant for successful project implementation. These variables cluster into three factors: those independent of project characteristics, those influenced by project uncertainty, and those influenced by project scope. The study shows the broadness and diversity of the subject at the level of individual projects.

3.3 Success measures

Interestingly, neither Shenhar nor Gemünden appeared to have cross-referenced the research each other did yet both helped advance the CSF school in similar ways (Gemünden *et al.*, 2005; Shenhar *et al.*, 2002). In many ways, Shenhar's contributions extended our understanding of success measures from assessing performance beyond singular concepts, singular units of analysis, and strictly using financial metrics. Shenhar's framework was similar to the balanced score card (which met with mixed reviews) as it was more holistic than the traditional focus on shareholder metrics (Bontis and Fitz-enz, 2002; Maltz *et al.*, 2003). Prior to this, research in project management had focused on improving efficiency and effectiveness by focusing on such models as project management maturity (Hartman and Skulmoski, 1998; Ibbs and Kwak, 2000; Mullaly, 2006).

Building on the work of Pinto and his colleagues, Shenhar and his colleagues conducted a number of empirical studies on the multi dimensions of success (Lipovetsky *et al.*, 1997; Maltz *et al.*, 2003; Shenhar *et al.*, 1997, 2002). Similar to Gemünden, Shenhar anchored his research predominantly in the management domains of organizational effectiveness and strategy. Shenhar and his colleagues also focused on the independent variables of different levels of success for the organization. Defining effectiveness at the project, business unit, and company levels, their research identified three clusters of success – meeting design goals of time, budget, and performance, impact on the customer, and benefits to the organization. Project managers distinguished between four dimensions of success:

- (1) project efficiency;
- (2) impact on customers;
- (3) business success; and
- (4) strategic potential.

A crucial point about these four dimensions was that they spanned four different time horizons. Their findings indicated that meeting design goals was not a homogeneous dimension; time and budget comprised one dimension as it was resource-related, but meeting specifications related to customer satisfaction. Unlike prior findings in the field, customer satisfaction was the number-one criterion for overall project success and meeting design goals was next. Like Gemünden, the items used to assess the dimensions of business success and strategic potential pertained to market share, new product lines, and new technology and items were worded on a relative basis so that participants could compare their company to competitors. This approach is very consistent with research in the management literature. Shenhar also made clear connections to the strategic value of projects by indicating that longer term objectives were necessary to avoid the operational view of project management. For the same reason, he did not distinguish between project and product success.

Appendix 3 shows the variety of dimensions as they developed over time within project success factors and within success criteria by using three examples in each category. The perspective of CSF developed and broadened from being merely structural in 1974 to being more task oriented in 1988, and team oriented in 2001. The perspective of project success developed from merely hard measurable factors in 1988, via a broadening towards marketing and user orientation in 2002, to a more balanced construct in 2006, with 50 percent hard dimensions, such as measures, and 50 percent soft dimensions, such as satisfaction of those involved.

3.4 The relative importance of different dimensions of success

Dvir and Lechler examined the relationships between three planning variables (i.e. the quality of planning, goal changes, and plan-changes) and project success (2004). Using multivariate analyses, they determined that planning was significantly and positively related to efficiency and customer satisfaction (project success). “The quality of planning has the highest positive direct effect on efficiency, while goal changes have the highest negative direct effect on customer satisfaction” (p. 10). They also found that additively, goal changes and plan-changes were stronger than the quality of planning.

The relative importance of success criteria was investigated by (Author). These authors took a leadership theory perspective to their study and showed that project managers on different types of projects and from different industries perceived different success criteria as being important for project success. Within the framework of ten success criteria (overall success (i.e. time, cost, quality), meeting user requirements, meeting project purpose, re-occurring business, self-defined criteria, and the satisfaction of customers, end-users, teams, stakeholders and suppliers), they found that the project managers perceived importance of success criteria varies by project traits. In highly complex projects with fixed price contracts customer satisfaction is perceived as a more important success criterion than in other projects. They also identified that importance varies by project manager traits. Older project managers assigned a higher importance to team satisfaction than their younger colleagues and, in turn, they were more successful than their younger colleagues. Geography also made a difference as European project managers placed a lower importance on the satisfaction of end-users, suppliers, teams, and other stakeholders than project managers from other parts of the world.

The same study assessed the importance assigned to the ten success criteria against the reported level of success on these criteria. Results showed that the importance

assigned to team-satisfaction was most significant as it correlated with success in seven of the ten criteria (in support of Hoegl and Gemünden (2001)). This was followed by the importance assigned to end-user satisfaction (correlated with the level of success of five of the success criteria) and customer-satisfaction (correlated with the level of success of four success criteria). In summary they showed that the importance assigned to team satisfaction differed by nationality, project importance and age of project manager. The importance assigned to stakeholder and supplier satisfaction differed by nationality and project complexity; end-user satisfaction differed by nationality; and reoccurring business and customer satisfaction differed by contract type.

We searched the ABI INFORM library databases for the 2000-2010 timeframe for recent publications on project success in two key journals – *The Journal of Product Innovation Management* and the *Academy of Management Journal*. We focused on these two journals for several reasons. First, the *Journal of Product Innovation Management* is well-known for its concentration on theoretical, research, and practice in the new product and service development fields which relates to project management. Second, the *Academy of Management Journal* is a leading management journal that focuses on empirical papers and the management domain significantly relates to project management. Using key words in conjunction (i.e. project, project management, success, success factors, and performance), we identified 22 articles in the *Journal of Product Innovation Management* and eight in the *Academy of Management Journal*. Of the 22 papers, 13 in the *Journal of Product Innovation Management* used the term “project” as the dependent variable; four of the 22 papers used “firm” as the dependent variable, and four of the 22 papers used “project” and “firm” as the dependent variables. When we examined the eight papers in the *Academy of Management Journal*, we found that four of the papers applied subjective manager judgement, two of the papers defined the dependent variable in terms of traditional time, cost, performance plus other measurable criteria, one as return on investment over time, and one as learning plus speed of adaptation.

We did not find indications that the authors who published their papers in the *Journal of Product Innovation Management* reached the high citations we identified in Appendix 1. Contrarily, six of the eight *Academy of Management Journal* articles had citation rates between 100 and 300. Given the rigor with which the papers in product innovation management were completed and their interesting findings on success as a type of performance measure, it is disappointing to see a lack of cross-fertilization between this journal and the main project management journals. In part, we attribute this to the narrow ways in which discipline-specific research tends to evolve over time. This is unfortunate because there is much to be gained by “standing on the shoulders of giants” in fields closely related to project management, and vice versa.

In summary we can see that the last decade involved a number of contributions that contributed to our understanding of project success, especially the role of CSFs. Increasingly, studies were based on broader managerial or organizational perspectives and reflected the multi-dimensional nature of the project success construct.

4. The relationship between the project success and organizational success literatures

As a society, we are accustomed to success measures in accordance with the financial model that looks at tangible assets and values them in dollars. This is reflected in the many quantitative and rational measures of project success, like delivery within time,

cost and performance constraints. However, “[...]the essence of wealth is the prospect of benefits, not their physical source” (Baxter, 1985, p. 218). In other words, at the organizational level the emphasis is also on qualitative measures such as the balanced score card (Bontis *et al.*, 1999; Sussland, 2001) and the performance prism which encourages us to assess stakeholder satisfaction and what the organization wants and needs from them (reciprocal relationships) as well as align strategies, processes, and capabilities. The prism challenges us to question what we are measuring and why so that we can focus on meaningful measures and communicate the performance practices within the organization (Neely *et al.*, 2002). In a marketing context, “Organisations perform by satisfying their customers with greater efficiency and effectiveness than their competitors” (Neely *et al.*, 2005, p. 1228). Neely *et al.* also refer to measures related to quality, time, cost, and flexibility, thus link organizational performance with project success. More recently, a small stream of conceptual papers has emerged on project and portfolio management practices using strategic management theories on resources, competences and capabilities (Authors). Quality improvement tools and techniques in project management help draw attention towards effectiveness measures and heighten awareness of the importance of gathering input from the customer (Jonker, 2000; Kumar and Wolf, 1992; McManus, 1999). The client satisfaction measures for project success address this aspect (Pinto and Slevin, 1988b).

In order for project management to have strategic value a clear connection must be made between how efficiently and effectively a project is done and how the project's products and services provide business value; otherwise, project management is perceived as providing tactical (operational) value only. Efficiency, not effectiveness measures tend to dominate the literature on project success. Effectiveness measures are not tangible or as easy to grasp as efficiency metrics, and they take longer to determine (e.g. over the course of the process improvement or project life cycle). Therefore, effectiveness is increasingly addressed at the level of project portfolio management, where functional and project organization meets at the level of middle managers for the benefit of the organization (Author).

The above review of project success measures and CSFs showed an increase in diversity and time span of measures. Project success was only a subject of the implementation phase in the 1980s. From there the literature on project success gradually extended into the concepts phase and close-out phase. Today, the success literature spans the entire product life cycle and extends from product success to business success. For example, in the automobile industry, success is determined partially by the degree of wrecked auto parts that are recyclable. This development pertains to the growing interest in corporate social sustainability. Today, another shift in views on success pertains to business ethics. For example, as fair trade practices become more widely accepted and supported, they extend to the corporate governance level where these concepts are incorporated into how organizations perceive of project/product success. These corporate and governance level shifts further focus both academic and industry attention towards project and program governance through project management office, steering committees, and program/portfolio management (Author).

5. The future of project success

This paper began by examining several classic contributions by Pinto and his colleagues on project success. The popular contributions by Pinto, Slevin, and Prescott laid the

foundation for the more recent developments in the project success literature. We then provided a snapshot of our evolving understanding of project success to highlight some of the seminal contributions of the last decade. These recent publications help us advance our understanding on the complexities of project success in terms of the concepts, constructs, as well as in terms of research methods, and theoretical foundations.

The above review indicates that project success is a multi-dimensional and networked construct. Project success is impacted through the interactions of personal, project, team, and organizational success. Project success is influenced by competences and quality of teamwork, but also project scope, cost, and time management. Defining and measuring success lead to discussions on efficiency and effectiveness at the organizational, team, and individual levels. Perceptions of success and the related importance of success dimensions also differ by individual personality, nationality, project type, and contract type. To a great extent, project success continues to be “in the eyes of the beholder”.

In terms of research methods, we have made progress as evident by the use of some multivariate approaches that are better suited to the complex dimensions of the success school. We are also seeing the trend towards the use of more sophisticated measurements including the broader use of valid and reliable items, instruments, and improved tools for studies, such as web-based surveys. We are also advancing from narrower project management perspectives towards mid-range theories and perspectives based on such management domains as organizational, management, and leadership theories.

What does the future hold for us in terms of understanding project success? There is a clear need for the project management field to define success. This is vital for empirical studies that take concepts and develop meaningful and measurable constructs from them. Researchers in the field should justify why they position success as a dependent or independent variable in their contributions. Although progress has been made on theorising CSFs and success, the research is predominantly empirical, and more research anchored within the academic realm remains to be done. Questions related to why certain CSFs are success factors and others are not or why individuals continue to have different perspectives on success remain to be further understood.

As indicated by the variety in project success factors and success criteria, the contemporary understanding is that “project success is predominantly in the eyes of the beholder”. More emphasis on contextual factors is needed in future research studies to allow for clearer definitions of success for different project types. However, it needs to be stressed that project success is and will always be a subjective judgement from different perspectives, which are formed by an individual's position in the organizations, their role and their worldview. In the words of Pablo Picasso (n.d.) “If there were only one truth, you couldn't paint a hundred canvases on the same theme”. To that end research can only approach the general features of project success and individuals need to weigh the importance of the different success dimensions in relation to the specifics of their role and their relationship to the project they are judging on.

However, our hope is that we will see more research that incrementally builds on the contributions of others. For example, we would like to see some of the research relate to the contributions by Neely and colleagues (Neely *et al.*, 2002, 2005). Our hope is that we will see more research that is based on comparative analyses and longitudinal studies. Our hope is also that we will see more research that examines causal relationships between success factors, project success and organizational success, and research that

explores moderating and mediating variables of success. We also hope to see more rigorous interpretivistic research because there is already an acceptance of post positivistic and realist research in the project management research community and much can be learned about project success by our acceptance of different world views in terms of conducting research on project success.

To summarize, this paper reviewed the classic contributions in project success and some of the more recent project success related studies of the last decade. Major developments in content, methods, and theoretical perspectives were also reviewed. What will the next classic contribution be? Although we cannot see the future, we can continue to stand on the shoulders of the past and current emerging giants in the project success field to gain a clearer sense of where we are heading.

Note

1. The fourth period was entitled "The 21st century", but since this school is still evolving, we limit our analysis to Periods 1-3 for this article.

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Table AI.
Citations rates of top 15
journal articles with
"project success" in their
title (2011)

Table AII.
Web of knowledge top
five project success
papers (2011)

No.	Journal paper	Web of knowledge citations
1	Hoegl, M. and Gemünden, H.G. (2001), "Teamwork quality and success of innovation projects: a theoretical concept and empirical evidence", <i>Organization Science</i> , Vol 12 No. 4, pp. 435-49	168
2	Pinto, J.K. and Slevin, D.P. (1987), "The critical factors in successful project implementation", <i>IEEE Transactions on Engineering Management</i> , Vol. 34 No. 1, pp. 22-8	121
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5	Shenhav, A. (1998), "From theory to practice: toward a typology of project-management styles". <i>IEEE Transactions on Engineering Management</i> , Vol 45 No 1, pp. 33-48	48

	Project success factors			Project success criteria	
	Pinto and Slevin (1988a)	Hoegl and Gemünden (2001)	Pinto and Slevin (1988b)	Shenhar <i>et al.</i> (2002)	Author (2006)
Murphy <i>et al.</i> (1974)	Project mission	Team performance	Budget	Meeting performance	End-user satisfaction
Coordination and relations	Top management support	Team performance efficiency	Schedule	Meeting technical performance	Supplier satisfaction
Adequacy of project structure and control	Project schedule/plan	Personal success in work satisfaction	Performance	Meeting project schedule	Team satisfaction
Project uniqueness, importance and public exposure	Client consultation	Personal success in learning	Client satisfaction	Staying within budget	Other stakeholders' satisfaction
Success criteria clarity and consensus	Personnel			Addressing a recognized need	Performance in terms of time, cost, quality
Competitive and budgetary pressure	Technology to support the project			Solving a serious problem	Meeting user requirements
Initial over optimism and conceptual difficulty	Client acceptance			Product used by customer	Project achieves its purpose
Internal capabilities buildup	Monitoring and feedback			Customer satisfaction	Customer satisfaction
	Channels of communication			Achievement of commercial success	Projects self defined success criteria
	Trouble-shooting expertise			Increased market share	
				Created new market	
				Created new product line	
				Developed a new technology	

Table AIII.
Examples of project success factors and project success criteria