Projects with internal vs. external customers: An empirical investigation of variation in practice

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Abstract

The purpose of this paper and the research programme of which it is part is to empirically investigate variations in project management practice. The research is based on the analysis of an extensive dataset containing information on the extent of use of a large number of practices and contextual variables related to organisational contexts and project characteristics. The paper focusses on the effects of the difference between projects with internal and external customers, which have been shown to be an important characteristic of the project context. A distinction is made between the extent of use of project management practices and the effect of variation in the extent of use on project performance, which are shown to be very different both conceptually and empirically.

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1. Introduction

This paper focusses on the contextual effects of one of the longest standing and best known contextual characteristic in the project management literature, the distinction introduced by Archibald (1976) between Type I and Type II organisations. Type I organisations do projects for external customers, whilst projects in Type II organisations do projects for internal customers. This distinction is based upon the make or buy decision, which has a very strong structuring effect on firm operations and governance and on relationships between firms, as shown by Williamson (1985, 1999). In the context of project management, it is applied to the production or procurement of customised products and/or services. Despite the fact that this distinction is both long-standing and well-known, it has been the object of very little empirical research. The paper draws upon previous results from the extensive research programme of which it is part (Besner and Hobbs, 2008, 2012a, 2012b, 2013).

1.1. Types I and II as organisational archetypes

Archibald argued forcefully that the contexts of these two types of organisations are very different and that this difference has a strong effect of project management practice. Type I organisations have specialised expertise in some area, which they use to produce customised products and services to meet the specific needs of their customer organisations. Because their activities are largely project based, they also have expertise in project management. The mission of Type II organisations is to deliver standardised products or services to their customers through established business processes, which are not organised on a project basis. Projects in Type II organisations are used to develop or modify the organisation’s products, services and business processes. The projects are designed to meet the needs of internal customers. Type I organisations typically have a contractual relationship with their customers, often on a project by project basis. Projects in...
Type II organisations are managed internally through administrative procedures.

The rationale for the decision to examine the differences between internal and external projects is based on the following observations:

1. In the large dataset of this research programme, the proportion of practitioners that report working in each type is split almost equally. Each therefore represents a significant portion of the reality of project management.

2. Type I and Type II have been used in the literature to describe the organisational context, see for example Turner and Keegan (2001). It is likely that many practitioners and researchers use it because they recognise its empirical validity.

3. This characteristic of projects has complex effects on practice. Many other contextual effects have been found to be unidirectional, for example, project size is associated with more extensive use of all project management practices. From both researcher and practitioner perspectives, unidirectional effects are easier to interpret and use. Some contextual effects are not unidirectional; they have a differentiated effect, meaning that their presence tends to increase the extent of use of some practices, whilst reducing the extent of use of others. The differentiating effects are more complex to interpret and use than unidirectional effects. They require the systematic analysis to which this paper is devoted. Previous research has shown that external and internal customers have a differentiating effect on practice (Besner and Hobbs, 2012a). Although the differentiating effect has been identified, it has not been analysed systematically.

4. Previous research has also shown that the type of project customer co-varies with several other characteristics of projects and with characteristics of the organisational context (Besner and Hobbs, 2012a). Although the co-variation has been identified, it has not been analysed systematically.

5. Based on a summary examination, the co-variations of the characteristics of projects, organisations and practices seem to form patterns.

The present paper investigates the patterns in the co-variation of the characteristics of projects, organisations and practices in order to identify patterns and to show that they form coherent organisational configurations as conceptualised by (Mintzberg, 1979). Doing so validates the current practice of using these labels to quality project contexts. With the detailed descriptions and analyses provided here, both researchers and practitioners will be better equipped to understand and intervene in each of these contexts.

1.2. Extent of use of practices and best practices

The project management practitioner literature and professional standards do not make a clear distinction between extent of use and “best practices”, meaning practices for which more extensive use contributes significantly to improved performance. The material presented in practitioner journals and conferences is very normative; it presents exemplary practice based on the authors’ experience.

Professional standards are based upon a consensus amongst practitioners as to what constitutes good practice (American National Standards Institute, 2014).

A standard is a formal document that describes established norms, methods, processes, and practices, as with other professions, the knowledge contained in this standard has evolved from the recognized good practices of project management practitioners who have contributed to the development of the standard (Project Management Institute, 2013, p. 1).

Thus the recognised good practice found in standards is both common practice and better practice. A distinction is made in this research between the extent to which a practice is actually used and the extent to which variation in use is associated with variation in performance. The two are considered to be conceptually distinct and are measured empirically with different methods. The results are compared.

1.3. Research questions

1. What characteristics of projects and organisational contexts are associated with internal and with external projects?
2. What are the differences in project management practices used on projects with internal and external customers?
3. Do differences in organisational context, project characteristics and practices between internal and external projects form configurations?
4. Does the extent of use of practices differ empirically from their contribution to performance?
5. Which practices contribute to performance in each of these contexts?

2. Literature review

The focus of this paper is on contextual variation in both project management practice and contribution to performance. The empirical study of contextual variations in project management practice is largely inspired by contingency approaches applied to the study of organisations in which contingent effects are often based on the identification of statistically significant associations between the context and the characteristics of organisations (Donaldson, 2001; Mintzberg, 1979; Schreyögg, 1980).

Crawford et al. (2005, 2006) investigate empirically what characteristics organisations use to create groups of projects: type of product or deliverable, life cycle stage, stand-alone or grouped, strategic importance, strategic driver, geographic region, project scope, project timing, uncertainty/ambiguity/familiarity, risk, customer/supplier relations, ownership/funding, and contractual issues. They provide a summary of much of the literature on each of these ways of grouping
projects (Crawford et al., 2005, pp. 147–166.) They also identify the two primary reasons that organisations create project groupings; first, to adapt project management practice to the characteristics of each group, and second, for use in managing the organisation’s project portfolio.

2.1. Success factors

There are a significant number of publications in the project management literature on success factors, which like best practices, are expected to have significant positive impacts on project success (Jugdev and Müller, 2005). Most of this research is opinion-based; the respondent is asked his/her opinion on the importance of a success factor in determining project success. Zwikael and Globerson (2006, p. 3435) and Fortune and White (2006, p. 56) present extensive reviews of the success factors found in the literature. These authors report several limitations found in this literature. “It should be noted that in a number of papers, factor definitions were unclear” (Fortune and White, 2006, p. 54). “There is only limited agreement among authors on the factors that influence project success” (Fortune and White, 2006, p. 54). In this literature, no mention is made of the proportion of success explained by the success factors.

A distinction should be made between “success factors” and “best project management practices”. An examination of the lists of success factors in these reviews reveals that the vast majority of the success factors identified in the literature are contextual conditions such as top management support (Young and Poon, 2013) that are not easily amenable to management control, particularly control by project managers, and cannot be considered “best project management practices”. Only one of the ten success factors in the best-known success factor model, the Project Implementation Profile (Pinto, 1990), is directly related to project management practices; “project schedule/plans” refers to the vast number of related practices.

Overall, the considerable opinion-based literature that presents lists of overall success factors only contributes marginally to an understanding of which project management practices contribute significantly to project success because the vast majority of success factors examined are not related to what is commonly understood by the expression “project management practice”. This literature does identify a large number of other contextual factors that are associated with project success. It is interesting that project management practice is not considered a major contributor to project success in this literature.

2.2. Studies of project management practice

Project management practices can be considered as “success factors” if it can be shown that they have a significant differentiating effect on project performance. There have been many studies identifying best practices based on correlations with success using rigorous methods to measure both practices and project success independently and to examine the relationships between them. However, these studies tend to examine a limited range of practices and/or practices in limited contexts (Chan et al., 2011; Kwak and Smith, 2009; Ling et al., 2009; McMahon and Lane, 2001; Meng and Gallagher, 2012; Raz and Michael, 2001; Suprapto et al., (in press); Vaziri et al., 2007; Winch and Kelsey, 2005; Xie et al., 2006). The objective of this paper and the research programme of which it is part is to produce a reliable and comprehensive portrait of project management practice. An examination of the vast literature on specific practices is beyond the scope of this paper.

The research by Cooke-Davies (2000, 2002) is a notable exception. He examines the association between project success and a very large variety of project management practices in a rigorous manner. Only a very small number of practices are shown to be related to success, which brings into question many of best practices found in the practitioner literature. In this research by Cooke-Davies, the emphasis is on showing that the results are generalisable across several industries, not on identifying contextual differences.

Several other significant research efforts investigating project management practice can be found in the literature. Shenhar and Dvir (2004) summarise 10 years of their research on how project management practice varies with context. Focussing on the new product development and innovation literature they propose the NCTP model based on four dimensions: produce novelty, complexity, technological uncertainty and pace. Product novelty is examined on a scale of derivative, platform and breakthrough. Complexity is examined on a scale of assembly, system and array. Technology is examined on a scale of low, medium, high and super-high tech. Pace is examined on a scale of regular, fast/competitive and blitz/critical. The vocabulary employed is clearly that of the field of technology and innovation management. Whether these concepts are generalisable to all types of projects in all contexts is questionable.

Zwikael and collaborators investigate the project planning phase. In an exploratory study, they show that the overall quality of planning varies amongst four industries, construction and engineering, software and communication, services and manufacturing, decreasing in this order (Zwikael and Globerson, 2004). Their measure of the quality of planning is clearly linked to the extent of use of planning processes and practices. In their empirical study (N = 202) they examine both the extent of use of 16 planning processes and their contributions to four different measures of success. They show that “actual use intensity of planning processes is not based on their impact on project success” (Zwikael and Globerson, 2006, p. 3444.). They also show that the critical success factors vary between the engineering, software and service industries, but do not provide data on the variations in extent of use between industries. Zwikael (2009) (N = 783) examined the PMBOK Guide (Project Management Institute, 2008) knowledge areas instead of the planning processes, but still within the planning phase. Extent of use and contribution to success are reported as well as the fact that the two are not linked strongly one to the other. The study also shows that industry moderates the effect on success of two of the nine knowledge areas, time and scope, but not the others. No data is
provided on variations in the extent of use of the knowledge areas for the six industries examined. Zwikael and Ahn (2011) (N = 701) focus on risk management practices in the planning phase. Reviewing the literature they found “inconsistent relationships among risk levels, risk planning, and project success in various project contexts” (Zwikael and Ahn, 2011, p. 27). They show that the level of risk and the extent of use of risk management planning vary between New Zealand, Israel and Japan and between seven industrial sectors. They examined the level of project risk and the use of risk planning practices as a moderating variable for the relationship between project level risk and four dimensions of project success and found that “risk management planning does not always impact project success, as it depends upon the level of project risk” (Zwikael and Ahn, 2011, p. 31). The studies by Zwikael and collaborators investigate the planning phase exclusively, but as project management practice is more highly developed in the planning processes, this represents a significant portion of project management practice.

Papke-Shields et al. (2010) (N = 142) extend the study by Zwikael and Globerson (2004) adding the initiation, execution and controlling process groups to the planning processes. They also report results according to the PMBOK Guide (Project Management Institute, 2004) knowledge areas, but in several cases the analysis was more detailed, going more systematically to the level of individual practices. The results for the extent of use across knowledge areas for the two studies are consistent. Papke-Shields et al. (2010) examine the relative extent of use of the 52 individual tools and techniques and report patterns that are similar to those found in the present research programme (Besner and Hobbs, 2012a). They report the more extensive use of tools and techniques on bigger projects for six of the eight knowledge areas.

Papke-Shields et al. (2010) also examine the relationship between the extent of use and an aggregate measure of project success. Significantly greater average use on successful projects is reported for all eight knowledge areas. In addition, they report several significant correlations between individual items and dimensions of success. However, they do not indicate the percentage of variation in success explained. They too report that “PM practices that make a difference may not be the most frequently used” (p. 650).

Patanakul et al. (2010) (N = 412) examine the use of 39 tools and techniques, 28 of which are also included in the present study. Many of the results are consistent. However, their study shows the Monte Carlo method as being used frequently, which is not consistent with the results of the present research. The authors report variations in use across the phases of the project life cycle. Unfortunately, they do not sort the tools and techniques by extent of use for the entire sample or by phase, which makes the results difficult to interpret or to compare with other studies. The criteria used to qualify tools and techniques as “frequently used” is not very restrictive; 28 of 39 tools and techniques are qualified as frequently used in the planning phase and 29 of 39 in the execution phase. A complementary approach would be to test whether differences in use between phases are statistically significant; however, this is not done. They also report the contribution of each tool or technique to each of eight measures of project success using regression analysis. The results show that the tools and techniques that contribute significantly to success vary by phase and the measure of success to which they contribute also varies. However, the percentage of variance explained is very small. They too report that the extent of use is not related to the impact tools and techniques have on project success.

Fortune, White and collaborators investigate project management practice on a range of projects in a range of contexts. White and Fortune (2002) (N = 236) examine the use of project management methodologies, of 28 specific tools and techniques and of “project management software”. Of the 28 specific tools and techniques, 10 are also examined in the research programme upon which this paper is based. The reported extent of use is consistent between the two studies. The list of tools and techniques was modified in Fortune et al. (2011) (N = 150). The results are consistent with those of the current research programme except for the fact that Fortune et al. (2011) show very limited use of “project goal charter” and stakeholder analysis, whilst the results from the current programme show extensive use of the “project charter” and moderate use of stakeholder analysis (Besner and Hobbs, 2012a). Fortune et al. (2011) and Jugdev et al. (2013) did not find significant differences between the UK, Canada and Australia. An innovative feature of these studies is the qualitative evaluation of the limits and drawbacks to the use of the methods and tools examined, which provides insight into the difficulties practitioners experience when using them. Only one limitation is related to a contextual factor “inadequate for complex projects” (p. 9), which is associated with project management software (p. 10).

Turner has done considerable work on contextual variation in project management practice over an extended period of time. One of the best known project typologies is the goals and methods matrix, which uses two dimensions to classify projects: how well-defined are the project goals, and how well-defined are the methods used to accomplish the project (Turner and Cochrane, 1993).

Turner et al. (2009, 2010, 2012) investigate project management methods in small and medium enterprises (SMEs). They observe that SMEs use projects in two very different contexts; projects to deliver customised products and services to external customers and internal projects to innovate and grow and that “SMEs whose mainline business is project-based use project management to manage operations” (Turner et al., 2010, p. 754). Turner et al. report that the firms that undertake internal projects are significantly older and have more employees than those that do not do internal projects. In addition, the firms that use formal project management on internal projects have more employees and most significantly higher turnover than the firms that do not. The lack of a difference between the firms that undertake and use formal project management on external projects may mean that firms are more likely to respond to the requirement of the client on external projects.” (Turner et al., 2012, p. 953).

In a qualitative study of 18 cases, Turner et al. examine the differences in project management practice between micro, small, medium and large organisations and observed that “In
small and micro companies, the way project management is applied is strongly dependent on the commitment of the founding entrepreneur and that “In medium-sized companies, formal project management is one of the structures that has to be implemented to allow the company to grow beyond 50 people” (Turner et al., 2010, p. 750). They did not find differences by industry, but found “noticeable differences by country, ranging from the demand for laissez-faire styles in Ireland and Sweden to much greater compliance in Romania and Austria, with the acceptance of much more autocratic styles” (Turner et al., 2010, p. 751). These studies investigate the extent to which respondents felt that project management practices are “essential,” which does not differentiate very clearly between extent of use of project management practices and those respondents believe contribute to project performance. This research by Turner et al. is the only empirical study of the differences in project management on internal and external projects the authors are aware of.

2.3. Conclusion from the literature review

There has been a significant research effort examining project management practices and contextual variations in practice. Several studies have made a clear distinction between extent of use and contribution to project success, but not all studies make this distinction consistently. Studies that make the distinction show that the two are not related (Patanakul et al., 2010; Zwikael, 2009; Zwikael and Globerson, 2006).

Studies of project management practice are made at both aggregated levels of methodologies and of knowledge areas and at the level of individual tools and techniques. Some studies include both. The number of clearly defined individual tools and techniques investigated varies between 28 and 52. In all cases, the researchers focus on those they feel are the most extensively used. In contrast, the present research examines 108 such items, including some that are used very little. Some of the tools and techniques included in the studies are amongst the least extensively used according to the results from the present research programme, suggesting that researchers may be including tools and techniques based to some extent on personal preferences.

There have been few investigations of the relationship between individual practices and project success. The majority of these studies have examined multiple measures of project success and found that different practices contribute to different measures of success. However, the only study that reports the percentages of variance explained indicates that the percentages are very low.

Patanakul et al. (2010) show that the extent of use varies across project phases and that extent of use is related to project size. The results from Papke-Shields et al. (2010) and Turner et al. (2010) reporting that they did not find differences between industries is counterintuitive. However, Zwikael (2009) report a moderating effect of industry on the impact of practices on success. Fortune et al. (2011) did not find differences between the UK, Australia and Canada, but Zwikael and Ahn (2011) report that extent of use of risk management planning varies between New Zealand, Israel and Japan and between seven industrial sectors.

When comparing small and medium size companies Turner et al. (2010) report that organisation size is related to the use of formalised project management for internal projects, but not for projects for external customers. However, Papke-Shields et al. (2010) did not find a relationship between extent of use and organisation size, which is a counterintuitive result. Because of the large number of different practices and the large number of contextual characteristics that may impact their use, the study of contextual variations in project management practice is a complex subject to investigate empirically. The results from the studies examined here are fragmented. Much more work is needed on this topic.

3. Methodology

Because this paper is part of an extensive research programme, the methodology has been described in detail in Besner and Hobbs (2012a). The aspects that are relevant to this paper are summarised here for the reader.

3.1. The approach

The goal of this research programme is to produce a comprehensive and reliable portrait of project management as it is practiced in reality. This goal leads the research in two seemingly irreconcilable directions. On the one hand, the objective is to report on the real behaviour of practitioners, which points to a qualitative approach. On the other hand, the objective of being comprehensive in such a vast and varied field and to produce results that are reliable and generalisable points to the need to measure many variables and to have a very large sample. These seemingly contradictory goals are achieved by investigating to what extent practitioners actually use specific tools and techniques that are easily identifiable and well-known and thus reveal what they are actually doing.

The choice to investigate the extent of use of very specific tools and techniques, such as using the Gantt chart, as opposed to more general processes, such as planning, has the advantage of providing information that is more precise and more reliable and better reflects what the respondent actually does in professional practice. The choice to focus on tools and techniques that are specific to project management, such as the progress report, as opposed to tools and techniques of general management, such as techniques for providing feedback to a subordinate, has the same advantages. Note that the use of project management software is based on the use of different functionalities rather than specific software packages, because this provides a much better indication of what practitioners are actually doing. Because all the tools and techniques investigated are very well-known within the project management practitioner community, responses to the survey instrument are unambiguous. These choices have two important drawbacks. First, because the field of project management practice is very large and contains many specific tools and
techniques, the survey instrument is large. Second, because the tools and techniques for many very important management practices such as communication, leadership, and conducting meetings are not project specific, the study contains little information on these important aspects of practice.

3.2. The survey instrument

The research is based on a survey completed by individual experienced project management practitioners. It is important that respondents have significant experience in project management because they are being asked to report on what they actually do when managing projects. On average, the respondents have 16.2 years of project management experience. The current role of respondents is programme manager (27%), project manager (50%), team member (10%) and other (16%). The respondents are from North America (57%), Europe (27%) and elsewhere (16%). No important differences are observed between regions (reference removed).

The questionnaire is divided into three sections: 1) respondent demographics, 2) organisational context and project characteristics, and 3) the extent of use of project management practices, tools and techniques. The extent of use of 108 specific project management practices is investigated using a 5-point Likert scale with responses from “not used” to “very extensive use”. The survey instrument has been published in Besner and Hobbs (2012a).

3.3. Contextual variation

The following contextual variables are examined:

- Public vs. private sector
- International vs. local or national project
- Degree of innovation in project
- Project complexity
- Similarity of projects
- Precision of project definition
- Organisation size
- Organisational structure (functional to projectised)
- Project managed as part of a programme
- Participation of project manager in the front-end
- Organisational project management maturity
- Organisational support for project management
- Availability of competent personnel
- Internal vs. external customer
- Type of project (engineering & construction, IT and telecom, software development, business & financial services)

The contextual variables and project characteristics are identified using one straightforward question each. The majority of contextual variables were measured using 5-point Likert scales. However, the measures of the following contextual variables were dichotomous: public vs. private, managed in programme or not, internal or external customer, well-defined vs. ill-defined, projects are fairly similar or quite different. A few variables are nominal, including the type of project deliverable and the distinction between local, regional, national and international. The variance was high on all the variables indicating that the sample covered a great variety of different contexts. On dichotomous variables, the sample is split almost evenly, for example, 51% of projects have external customers. However, the samples for the different types of project are not balanced, see Section 3.5. All of these contextual variables have an effect on project management practice. There are many interaction effects amongst contextual variables.

3.4. Groups of project management practices

The field of project management practice is vast. A comprehensive portrait of practice must therefore examine a large number of individual practices. Analysing a large number of individual practices is cumbersome and fastidious. Furthermore, the results of such an analysis would be very difficult to use in further research or in practice. However, practitioners tend to use specific project management practices in groups; risk management practices, for example, tend to be used as a group of practices. Through a principle component analysis the dataset of 108 specific practices was reduced to nineteen groups of practices (Besner and Hobbs, 2012a, 2012b).

3.5. Data collection and sample size

The data was collected in two phases; in the first 753 usable responses were collected and 1296 in the second. All of the analyses presented in this paper are based on the data from phase 2 ($N = 1296$) with few exceptions.

In order to limit the size of the survey instrument in phase 2, questions on the extent of use of the practices in the cost estimation and quality management groups of practices were removed. Information on these groups of practices is, therefore, drawn from phase 1 ($N = 753$). The results present reliable information on the extent of use of these two groups of practices and on the differences in extent of use between internal and external projects. However, these two groups of practices could not be included in the regression analyses employed to identify contributions to performance.

Because the type of project is the only contextual variable that is not split almost evenly, this variable is the only one for which sample size may causes problems during the analysis. The project management practitioner community is dominated by people working on IT and telecom projects. In the sample, 68% of respondents reported working on this type of projects, which is in line with the memberships of professional associations. Therefore if the entire sample was used in analyses the comparisons between internal and external projects would be heavily weighted by the responses for IT and telecom projects. For this reason, a randomly selected subsample for IT and telecom is used. This reduced the sample size from 1296 to 657, which is still sufficient to support all of the analyses presented in the paper.
3.6. Performing maturity: The dependent variable

The survey instrument in phase 2 includes a question regarding performance. High and low-performing organisations are identified from the respondents’ perceived rate of project success of their organisation when compared with organisations from the same sector of activity. Following a survey of 105 large organisations Cooper et al. (2004) concluded that overall success measured against competitors was “particularly robust” (p. 35). Performance is measured on a 5-point Likert scale.

Principal component analysis identified a construct labelled “performing maturity” that is composed of the performance variable and three organisational contextual variables: organisational project management maturity, organisational support for project management and availability of competent personnel (Besner and Hobbs, 2012a, 2012b). This construct is used as a dependent variable in regression analyses to identify the contribution of contextual variables and groups of practices to performance. Because the performance variable was not included in the first wave, the two groups of practices that were not included in the second wave cannot be included in the regression analyses, i.e. the cost estimation and quality management groups.

3.7. Statistical methods

Because some of the variables are nominal, for example private vs. public sectors, and because some of the distributions on Likert scales are not normal distributions, all the variables have been converted to non-parametric scales. Comparisons between subsamples are carried out using non-parametric analysis of variance (ANOVA, Kruskal-Wallis) procedures applied to measure significant differences in both contextual characteristics and the extent of use of the different groups of practices in subgroups. Statistical significance reported in this paper is from the results of non-parametric t-tests, i.e. Mann–Whitney test of significance for the comparison of the means between two independent groups.

The regression analyses are carried out using a dummy interactive technique (Neter et al., 1989). In all cases the VIF are below 2.0, indicating that there are no problems with multicollinearity. When the entire sample is split into a number of distinct groups, as is the case for the division by type of project, one of the types must be omitted from the analysis. The business and financial service projects are therefore omitted from the regression models. Analysis confirmed that being of this type of projects is not a significant contributor to the explanation of performing maturity, so excluding it from the regression analysis has no impact on the results.

4. Results: Differences in context and in extent of use of practices

Section 4 presents the analysis of differences in context and in the extent of use of practices. Section 5 presents the analysis of “best practices”.

4.1. Differences in context

The top portion of Table 1 presents the contexts of projects with internal and external customers for eleven contextual variables and performing maturity, the measure of performance. Eleven show significant differences, highlighting the fact that these two types of projects are found in contrasting contexts that are likely to form contrasting configurations. Business and financial service projects are more often carried out for internal customers and the majority of practitioners working on engineering and construction projects are employed by supplier organisations. External projects are carried out in Type I organisations under a mandate from a customer organisation. This basic relationship conditions many of the characteristics of this context. Supplier organisations have a tendency to be from the private sector. Internal projects are less often international. A mandate given to a supplier organisation is often better defined at the outset than an internal project and mandates received by external firms tend to be more similar than projects initiated within organisations. Larger organisations tend to do more in-house projects, whilst supplier organisations tend to be smaller. These differences in the contexts of internal and external projects have face validity. They describe the contextual configurations of Type I and Type II organisations. The distinction between Type I and II organisations can thus provide a basis for understanding the contextual differences between internal and external projects. Note that external projects score higher on performing maturity.

4.2. Differences in extent of use of practices

The lower portion of Table 1 presents comparisons in the extent of use of nineteen groups of project management practices for internal and external projects. There are statistically significant differences for only seven of the nineteen groups of practices. Project evaluation and selection is a much more salient issue for internal projects. For external projects, the evaluation and selection are made in the customer organisation. This can explain why business case definition and financial evaluation are used more extensively on internal projects. Because projects for external customers are usually done under contract, both fixed and variable priced contracts are used more extensively. Because of the contractual relation, project closure is a more formal process using the relevant practices more extensively. Databases are also used more extensively for external projects. Note that external projects are more similar and better defined, which makes them better suited to the use of comparative data. This data may be used for cost estimating.

The examination of differences in the contexts and in the project management practices found in internal and external projects has identified many significant differences between the two and with the overall sample. This illustrates the powerful effect this contextual variable has on project management practice and how it is related in a coherent fashion with characteristics of their organisational contexts, which form coherent configurations.
Differences between internal and external projects with a level of significance of \( p \leq 0.05 \) are highlighted. Where the differences are significant, the higher value for the mean is also highlighted. The groups of practices are presented in decreasing order of extent of use in the overall sample.

5. Results: Best practices

The analyses presented in the previous section examine differences in the contextual effects of the nature of customer relationships on project management as it is actually practiced. The present section of the paper examines the “best practices”; those for which a difference in the extent of use is associated with variation in performance as measured by the construct of performing maturity. The extent of use of project management practices is readily amenable to managerial control. Their status as “best practices” is, therefore, quite straightforward. Because in some cases the contextual variables are amenable to some degree of managerial influence, they may be considered as “best practices.” For example, the level of project definition is partly determined by the level of uncertainty in the context, but can also be improved by managerial efforts to better define needs and requirements, particularly with the use of the group of practices used in business case definition. Other variables, such as being in the public or private sector are less readily influenced, at least in the short term. Best practices are identified by regression analyses presented in Table 2.

In the regression analyses, the percentage of variance in performance explained is high, between 39% and 47%, as indicated by the adjusted \( R^2 \). This contrasts with many studies presented in the project management literature that report results explaining very small proportions of variance. The regressions, therefore, provide powerful explanations for differences in the scores for performing maturity. However the explanations of performing maturity are not very parsimonious, because a large number of variables make significant contributions to the explanation of performing maturity. In other words, the analysis did not fulfil the practitioners’ dream of finding a small number of best practices that will ensure better performance. However, the number of variables in the regression models for internal and external projects is smaller than that in the regression on the entire sample, but explains similar proportions of the variation in performance. Therefore the explanations of performance are more parsimonious in these specific contexts.

Note that of the six contextual factors that are significant in the overall sample only two are significant for both internal and external projects and that of the twelve groups of practices that are significant in the overall sample only four are significant for both internal and external projects. Thus, the factors effecting performance for internal and for external projects are quite different.

5.1. How context affects performance

The top portion of Table 2 shows that only two contextual variables have an impact of performance in both internal and external subsamples; these are smaller project size, and better project definition. Smaller projects are predictors of success in both subsamples, but there is no significant difference in their predictive power. In many contexts, project size is amenable to managerial control to some extent and can be considered a best practice. One of the ways organisations reduce the size of their large projects is to divide them up into several smaller projects that they often manage as a programme of projects (Pellegrinelli, 2011).

Project definition makes the largest contribution to performing maturity of all the contextual factors, thus revealing its importance as a predictor of performance. When projects are well-defined at the outset they have a significantly greater chance of success in both subsamples, but significantly more for internal projects. As indicated in Table 1, internal projects, which do not have the discipline of a mandate between a customer and a supplier organisation, are less well-defined on average. The fact that internal projects are more poorly defined is consistent with the greater impact of improved project definition for this type of project. Because the level of project definition is at least partially amenable to managerial influence, particularly with the uses of the group of practices used in
Note also that the extent of use is not related to the contribution to performing maturity. If more extensively used practices also contributed more to performance, the best practices would be concentrated in the top of the list, but this is not the case.

Twelve of the seventeen groups of practices are significant predictors of performance in the overall sample. Of all the results presented in this paper, this result most clearly discredits the practitioner inspired search for a small number of “best practices” or “success factors” as predictors of project performance that would be universally applicable.

Business case definition is the only group of practices that makes significantly different contributions to the explanations of performance for internal vs. external projects. Its contribution to performance is in both internal and external sub-samples, but the contribution is significantly stronger with internal projects, where as shown in Table 1 projects are less well defined. More extensive use of business case definition likely contributes to projects being better defined, which is the contextual variable with the strongest contribution to performance. Initial planning, team management and the use of databases are the only groups of practices that contribute significantly to the explanation of performance in the overall sample and in both internal and external sub-samples. The fact that six groups of practices are predictors of performance in both internal or external projects but not both and that these are split evenly between the two types are strong arguments for the need to consider the context when selecting project management practices.

Four groups of practices do not contribute to the explanation of performance. Both groups of practices related to contracts are in this group. As indicated in Table 1, both are used significantly more on external projects, which is intuitive. It may be that in current practice is well adapted and that there is no systematic variation in their use that contributes to or hampers project performance. Network planning is another group of practices not associated with performance. There are two groups of planning techniques in this study, initial planning and network planning. The former is both the most extensively used group of practices and a strong predictor of performance. The latter that includes more sophisticated planning tools and techniques is not. Financial analysis is the final group of practices that does not contribute to performance. A possible explanation might be that an overemphasis on financial evaluation in many contexts can lead to less appropriate project selection (Cooper et al., 2001).

5.3. The search for a “general prediction” of success

Project definition, small project size and the groups of practices in initial planning, business case definition, team management and databases contribute significantly in the overall sample and in both internal and external sub-samples. They might be considered as more general contributors than the other variables, but it is not possible to know from this analysis if and to what extent they contribute to performance in other contexts.
As discussed in Section 4, these differences form a coherent result related to differences in project management practice between them (Turner et al., 2012). External projects are found in Type I organisations by definition. Internal projects can be found in either type of organisation, but are much less prominent in Type I organisations. Type I and Type II organisations are found in different contexts; significant differences are found for eleven contextual variables as shown in Table 1. A significantly greater proportion of external projects are private sector, international, complex, similar to other projects in the organisation and well-defined. Type I organisations are smaller, have a more projectised structure and make less use of programme management. External projects also score higher on performing maturity. As also shown in Table 1, there are significant differences in the extent of use of seven of the nineteen groups of project management practices. As discussed in Section 4, these differences form a coherent pattern or organisational configurations. Archibald’s typology thus provides a framework for explaining the many relationships amongst contextual variables and the differences in project management found when comparing internal and external projects. It provides a plausible explanation that merits further investigation to develop it and to validate it. One way of doing so would be to study and compare samples of organisations of types I and II.

Archibald was a practitioner who worked on large technical projects in the 1970s when he first proposed this typology. At the time, the distinction was very clear in the industry he worked in and in the economy in general. Since then, changes in technology and in industrial organisation have blurred the distinction, which now takes on different forms in different industries.

For engineering and construction projects, the distinction between projects with internal or external customers is quite clear. Type I projects are designed and built by supplier organisations for customers that will exploit the resulting artefact once the project is completed. The customer has specific requirements and lets out a contract to supplier organisations to provide a customised solution. Often the customer organisation does not do enough of this type of project to be able to maintain the specialised expertise that this type of project requires. In these situations, the customer organisation calls upon specialised external suppliers to design and build the artefact. There are also customer organisations that have large volumes of similar engineering and construction projects and that can, therefore, develop and maintain in-house the competencies required for this type of project. Large utilities are an example of this type of organisation. However for this type of organisation, the degree to which engineering and construction knowhow is kept in-house or is outsourced varies from one organisation to the next and has varied over time. Since Archibald proposed his typology, there has been a tendency for organisations to outsource more of their engineering and construction work. The outsourcing of engineering and construction services can be done on a project by project basis or can be done on a more global basis by which the customer organisation hires a supplier to provide these services on a multitude of projects over an extended period of time. In this situation, the distinction between internal and external customers becomes less clear; a practitioner may be employed by a supplier organisation to work exclusively for a customer organisation. It would thus be less clear whether the project he/she works on have internal or external customers. Thus as managerial practices have evolved since Archibald proposed his typology, the distinction has become less clear-cut in some contexts. However, in the examples from engineering and construction there is still a customer organisation with specific requirements to which the project is meant to comply.

At the time Archibald proposed his typology, the distinction was quite clear in many other industries. In mass manufacturing, the automotive industry for example, the new product design projects were executed by teams in the research and development or product design departments. From their point of view, the results of the projects were delivered to the manufacturing organisation, which was an internal customer. However, with the advent of concurrent engineering, integrated project teams and greatly reduced product development cycles, the focus has shifted and practitioners on these teams have more of a tendency to see the end user as the customer of their projects (Prasad, 1996). Here as well, the distinction has become less clear with changes in managerial practice particularly those related to the role of suppliers in product innovation. However, the overall objectives of the project are specified in advance by the senior management of the firm and the project can still be seen as a response to specific requirements.

Information technology has also contributed to the blurring of the distinction between projects for internal vs. those for external customers. With traditional production technologies, the process to develop and deliver a new product to the market was long and protracted, involving many successive departments each of which perceived the next department in the sequential process as their customer. However, technology has changed this relationship in many sectors. An extreme example would be the video game industry. In this industry, the project is to develop a new game or a new version of an existing game, a software product. The customer is the gamer who will buy and use the product. Once the game has been designed, the process for distributing the product has been more or less automated and takes place over a very short period of time. In this industry, project personnel perceive their customer as external. There is not one external customer whose requirements must be met with a customised solution. This is but one example of how both technology and managerial practice have blurred the distinction significantly. The distinction remains relevant in many contexts, but caution should be exercised
when applying it in order to verify its relevance. Ultimately, a new typology of types of organisational relationships with project customers may need to be developed.

6.2. Project contexts are multidimensional

The analyses show that the type of customer has important impacts on project management practice. It also shows that the type of customer is significantly related to other contextual variables as shown in Table 1. Previous research has shown that many of these other contextual variables also have important impacts on project management practice (Besner and Hobbs, 2001a, 2012b, 2013). Therefore, considering only one contextual factor can lead to erroneous results. The consequence for research is the need to describe samples well by identifying several of the contextual factors that characterise the sample so that it is clear in which situations the results might be applicable. The consequence for practitioners is also the need to understand the multidimensional nature of contexts and not to rely on simple descriptions.

This being said, the analysis also reveals that customer type is associated with patterns of contextual variation that form coherent configurations. Customer type can, therefore, be a powerful tool for describing project contexts, but care needs to be taken to ensure that the elements of the configurations are present in the particular situation of interest, whether it be for research purposes or when seeking guidance for practice.

6.3. Does the extent of use of practices differ empirically from their contribution to performance?

This research confirms the finding from previous studies that the extent of use of project practices is not related to their contribution to performance. The two are conceptually and empirically distinct. It is paradoxical that this finding has been reported in several studies (Patanakul et al., 2010; Zwikael, 2009; Zwikael and Globerson, 2006), but ambiguities between extent of use of practices and “good” or “best” practices that contribute significantly to performance remain abundant in the project management literature.

6.4. Contributions to performance

The analysis shows that many variables contribute significantly to performance. Project definition is significant in all the regression models. It should therefore be investigated further to determine if its positive impact on projects performance goes beyond the contexts examined in this paper. “Project mission” defined as “initial clarity of goals and general direction” (Pinto and Slevin, 1989, p. 31) is one of the factors identified most consistently in the success factor literature; it was identified as the most important success factor in at least four studies (Delisle and Thomas, 2002; Pinto and Covin, 1989; Pinto and Prescott, 1988; Pinto and Slevin, 1989). Project practice could be changed to both increase the level of project definition and to better manage projects that are initially poorly defined. The project management practices that have the most impact on project definition are in the business case definition group of practices, which includes needs analysis, business opportunity/problem definition, project mission statement, assign project sponsor, updated business case at gates and the business case. This group of practices contributes significantly to performance in all the cases examined.

The Project Management Institute (2013) “assumes that business case assessment, approval, and funding are handled externally to the project boundaries” (p. 54) and that “project statement of work, business case and agreements” are inputs to project management processes (pp. 65–69 and p. 421). Needs analysis is described as part of this pre-project work (p. 68). This position is paradoxical given the strong influence of project definition and of the extent of use of the business case definition group of practices on performance, as well as the extent of use of this group of practices by project practitioners observed in this study.

Three other groups of project management practices were significant in the overall sample and for internal and external projects. These are initial planning, team management and the use of databases. The initial planning group of practices contains the tools and techniques required to produce “Project schedule/plans – A detailed specification of the individual action steps required for project implementation” (Pinto and Slevin, 1989, p. 31), which is one of the ten success factors in the Project Implementation Profile (Pinto, 1990). This is the success factor in this profile that is most clearly linked to project management practices. Neither the team management nor the use of databases is prominent in the success factor literature. That team management is not prominent is somewhat surprising. However, it is not surprising that the use of databases is not regularly reported as a success factor because databases are not used very extensively, as shown in this research. The fact that the use of databases requires significant organisational support can explain, at least in part, why this is the case. This does not prevent them from contributing to performance when they are used.

Many other variables, both contextual factors and extent of use of groups of practices contribute significantly to performance in some cases but not in others. This is again a strong argument for the need to take the context into consideration. Finally, there are four groups of practices that do not contribute positively to performance in the overall sample or in internal or external projects: fixed and variable price contracts, financial analysis and network planning.

6.5. Parsimonious explanations of performance

An examination of the regressions presented in Table 2 reveals that the regression models explain a substantial proportion of the variation in performance. This contrasts with most of the results in the project management literature in which the proportion of variation in performance explained tends to be very small. In this sense, the regression models are quite powerful and more “parsimonious” than many of the previous results. Further examination reveals that the regression models in subsamples provide more parsimonious explanations.
of performance than in the overall sample. In addition, a comparison between the coefficients in the overall samples and the subsamples reveals that the variables that have significant coefficients differ very often between subsamples and between a subsample and the overall sample. In many cases, a logical interpretation of the differences can be found. Taken together, these observations suggest that the search for “best practices” may be more fruitful in specific contexts than in the overall interpretation of the differences can be found. Taken together, the test of the differences between the coefficients reveals that very few are statistically significant. The results of the test to determine if “best practices” are significantly different in different contexts are not conclusive. This brings many previous results into question and opens up a avenue for further research.

7. Conclusion

This paper has focussed on the differences between projects with internal and external customers. It has shown that the distinction between these two types of projects and the distinction between organisations that do projects for internal or external customers are important determinants of project management practice. It has also shown that the factors that affect project performance differ between these contexts. To the best of our knowledge, this is the only empirical study to make an extensive examination of these differences. The conclusions are that the differences are significant, that they form consistent organisational configurations and that they can and should be used to guide both research and the contextual adaptation of project management practice.

It is widely recognised that project management should be adapted to the context. However, very little guidance is provided to practitioners in how to adapt practice to context. In addition, the guidance that is available is rarely supported by rigorous analysis. The results presented in this paper provide guidance to practitioners that is based on rigorous analysis. Practitioners seeking guidance as to what really effects project performance should consider the results presented here because they explain a very large proportion of variations in performance, between 39% and 47% depending on the context. Most other studies presented in the project management literature explain very small and often meaningless proportions of variation in performance and most of the normative practitioner literature makes no reference to the proportion of variance explained by their proposed best practices.

Conflict of interest

The authors declare that there is no conflict of interest.

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