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Current practice in project management — an empirical study

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Abstract

This paper reports the findings of a survey designed to capture the 'real world' experiences of people active in project management. The survey took the form of a questionnaire that was sent to 995 Project Managers and which achieved a response rate of 23.7%. Each respondent was asked to describe a recent project and identify factors that were regarded as critical to that project's outcome. The extent to which the project gave rise to side-effects was explored and particular emphasis was placed on the use that had been made of any of the many project management methods, tools and techniques that are available. Respondents were also asked to judge the effectiveness of the methods, tools and techniques they had used and to report any limitations or drawbacks they had encountered. The results showed that most respondents used only a small number of methods, tools and techniques with project management software and Gantt charts being the most widely used aids. Almost half of the respondents reported drawbacks to the methods, tools and techniques they had employed. The criteria for judging project success most cited in the project management literature (on time; to budget; and to specification) were the criteria used by the respondents to judge their projects' success. However, two further criteria were reported as being of particular relevance. These were both concerned with the consequences of the project on the organisation involve. In contrast to the finding of many surveys of project success rates, a remarkably high proportion (41%) of the projects reported upon here were judged to be completely successful, though it should be noted that the judgements were made by Project Managers who had worked on the projects being judged.

Keywords: Survey; Project management; Project success criteria; Methods, tools and techniques

1. Introduction

Project management is now well developed and well accepted as a domain for the exercise of professional expertise and as an area for academic research and discourse. Numerous methods and techniques have been developed, covering all aspects of managing projects from their genesis to their completion, and these have been disseminated widely in books and journals and through the work of professional bodies. However, project management remains a highly problematical endeavour. A great many projects exceed their budgets, run late or fail to meet other objectives. Indeed, surveys [1–3] suggest that this applies to well over a half of IT projects.

This paper aims to shed light on the reasons for the mismatch between the promise offered by project management methods and techniques and the outcomes delivered. It reports on the results of a recently conducted survey designed to capture the 'real world' experiences of project managers with a view to determining the extent to which those involved in the management of projects actually make use of the methods and techniques that are available and how effective the methods and techniques used are felt to be.

2. Research methodology

In order to capture the experience of project managers, a questionnaire was designed that would:

- identify any common criteria used for defining project success;
- explore the extent to which projects give rise to unexpected side-effects;
- establish a common list of 'critical success factors';
- identify the methods, methodologies, tools and techniques in current use in the field of project management;

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- identify any limitations or drawbacks to the methods, methodologies, tools and techniques being used.

First, a pilot survey was conducted with a questionnaire being sent to 30 project managers representing seven organisations. 20 responses were received and used to generate revisions to the questionnaire which was then sent to 995 project managers representing 620 organisations in both the public and private sectors. All of the recipients were asked to take part in the survey only if they had been actively involved in the management of a project and to base their responses on their most recently concluded project even if that project had been curtailed or abandoned. In order to maximise the chance of obtaining answers to sensitive questions the main survey was anonymous.

2.1. Questionnaire design

The revised questionnaire comprised 18 questions with a mixture of yes/no, scale, multiple choice and open questions. It explored the following areas:

- information about the respondent and the project upon which the replies were based;
- the criteria used for judging the project's outcome;
- any unexpected side-effects arising from the project;
- factors critical to the project's outcome;
- the methods, tools and techniques used;
- the limitations or drawbacks experienced with the methods, tools and techniques used.

3. Analysis of data and discussion of results

3.1. The respondents and their projects

Of the 995 questionnaires that were sent out in the main survey, 236 were returned (23.72% response rate). All of the questions were answered in nearly every case but two respondents failed to describe the part they played in managing their projects, one respondent failed to answer the question on limitations or drawbacks experienced with the methods, methodologies, tools or techniques and four failed to respond to the question on unexpected side-effects.

3.1.1. Project type

On the basis of the responses received the projects described were classified into 16 types (Fig. 1). Just over 25% (60) of respondents were involved with information technology projects, whilst reorganisation in either the public or the private sector accounted for nearly 19% (44) of the projects. 37.2% (88) of the projects were carried out for a client. 62.7% (148) of projects were carried out within the respondent's organisation.

3.1.2. Industry sectors

The 'Finance, Insurance and Banking' industry sector accounted for just over 16% (38) of responses. The breakdown is shown in Fig. 2.

Where projects were carried out for a client the respondent was asked to indicate the client's industry sector. The breakdown is shown at Fig. 3. The 'Transportation and Communication' industry sector accounted for just over 27% (24) of responses.

3.1.3. Number of employees

The number of employees in the respondents' and (where applicable) the clients' organisations, classified into five groups, are shown in Fig. 4. Nearly 66% (155) of respondents worked for organisations that employed 1000 or more employees.

3.1.4. Numbers involved

Respondents were asked to indicate the number of people directly involved in the project from their own organisation and (where applicable) to indicate the numbers directly involved from the client's organisation and any supplier's organisation(s). Their responses, classified into four groups, are shown in Fig. 5. The mode number of people directly involved in a project (including client and supplier organisations, where applicable) was 10.

3.1.5. Role of respondent

The surveys were addressed to project managers but, as Fig. 6(a) shows, only 47% (113) of respondents identified themselves by the title 'Project Manager'. However, a higher proportion, 63% (146), indicated that they had managed the project being considered (see Fig. 6b). The other titles by which people identified themselves and the parts they played in the projects can also be seen in Fig. 6.

3.1.6. Main decision maker

Respondents were requested to indicate who was ultimately responsible for decisions concerning the project. 43% (102) of respondents stated that they were the main decision makers. 33% (77) were involved in the decision making process, but 24% (57) of the respondents did not have any input into the main decision making processes.

3.1.7. Project duration

Project duration, broken down into seven categories, is shown in Fig. 7. 37% (87) of the projects lasted between 6 and 12 months and the mode duration of a project was 6 months.

3.1.8. Project completion

91% (215) of the projects were completed. 9% (21) of the projects did not run through to completion.

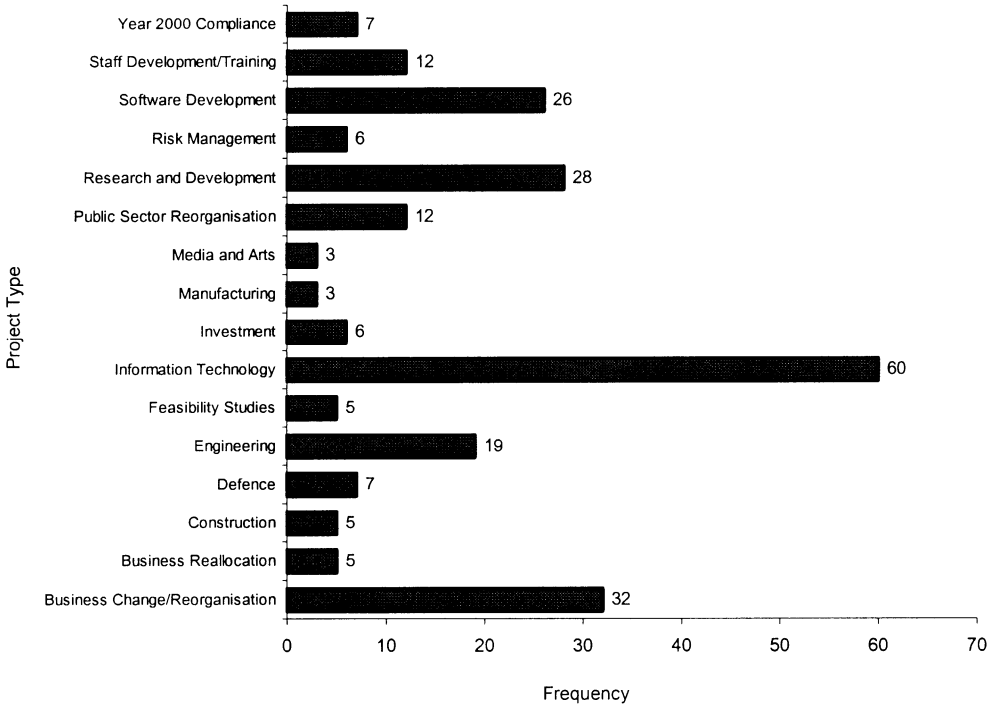

Fig. 1. Project type — frequency of mention. $N=236$.

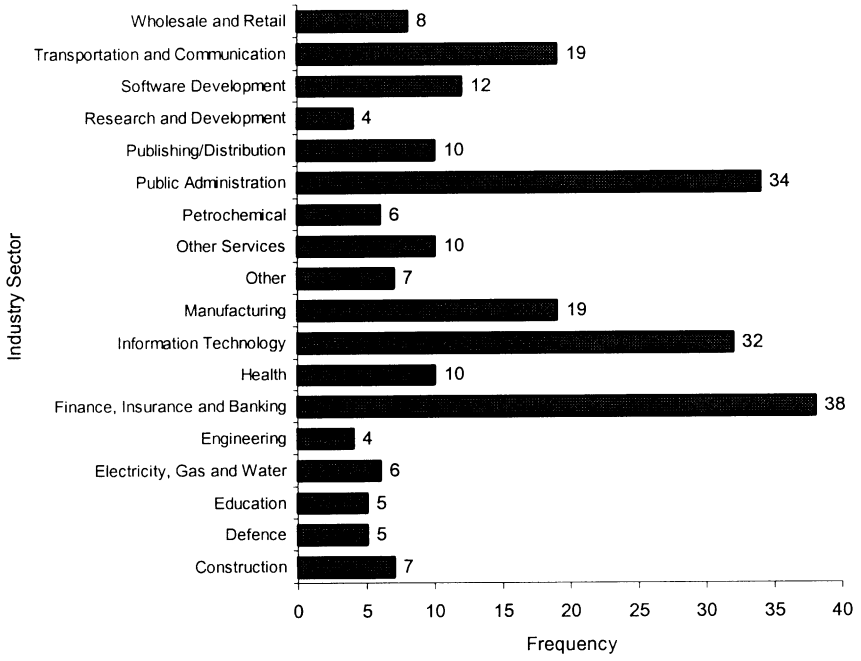

Fig. 2. Industry sector breakdown — respondent's organisation. $N=236$.

3.2. Criteria used for judging project outcome

3.2.1. Project outcome

Project outcome was measured using a bi-polar semantic differential continuous line scale. For analysis the line was divided into seven equal sections and coded from 1 (abandoned) to 7 (complete success). In the opinion of the respondents, 41% (97) of the projects were a complete success (Fig. 8). This success rate is far higher than that reported in the literature.

3.2.2. Criteria used for judging success

Respondents were asked to indicate and rank (from 1 to 5) the criteria they used for judging success. The ranks were re-coded (1 = 5, 2 = 4, 3 = 3, 4 = 2, 5 = 1 and criteria not chosen = 0). The sum of the re-coded

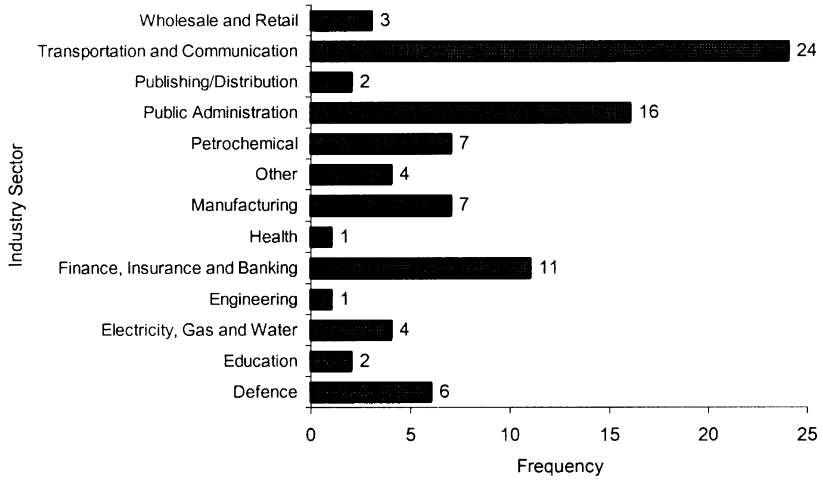

Fig. 3. Industry sector breakdown — client's organisation. $N = 88$.

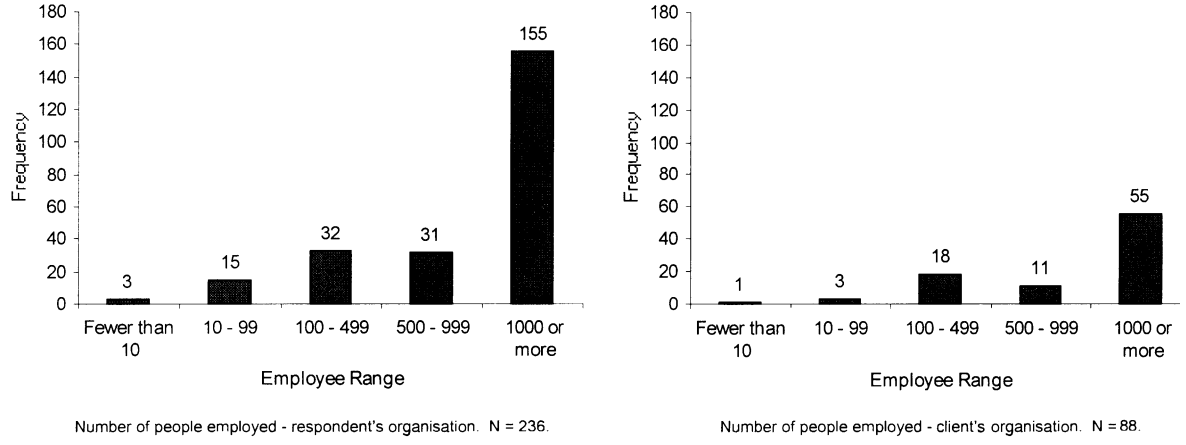

Fig. 4. Number of people employed.

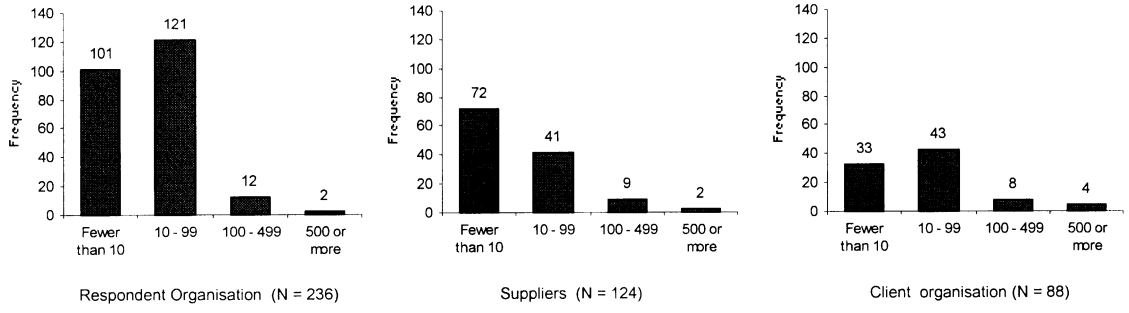

Fig. 5. Numbers directly involved in project — frequency of mention.

responses is displayed in Table 1 where it can be seen that 'Meets client's requirements' was the criteria most often ranked first by respondents, followed by 'Completed within schedule' and 'Completed within budget'.

Much of the literature suggests that criteria against which the success of projects is judged are time taken, cost and the extent to which requirements are met. These criteria were important to the respondents to the survey but in addition to these standard measures a significant number of respondents identified another citerion as important. This was the fit between the project and the organisation and the consequences of the project for the performance of the business. For instance, they talked about the need to meet organisational

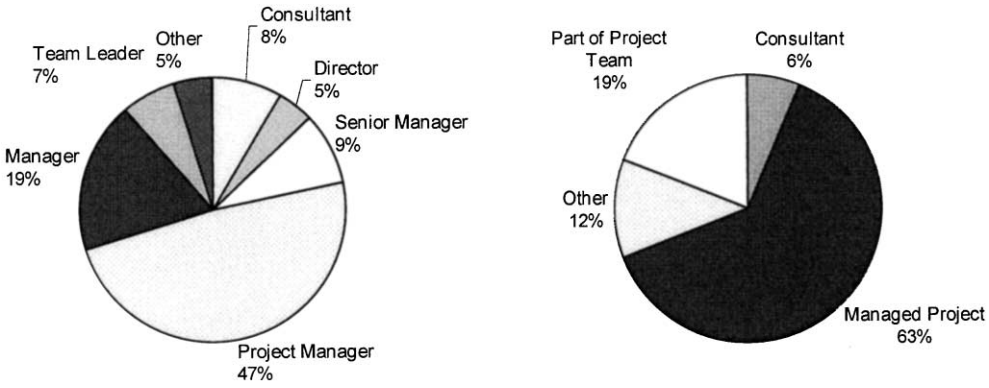

Fig. 6. (a) Role of respondents. $N=236$; (b) respondent's part in project. $N=234$.

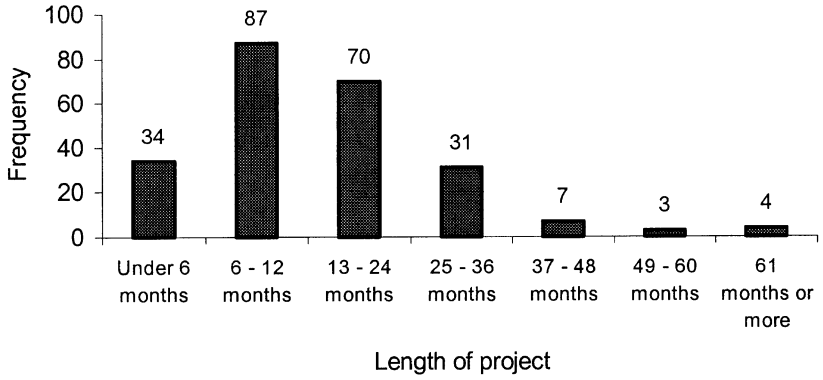

Fig. 7. Project duration — frequency of mention. $N=236$.

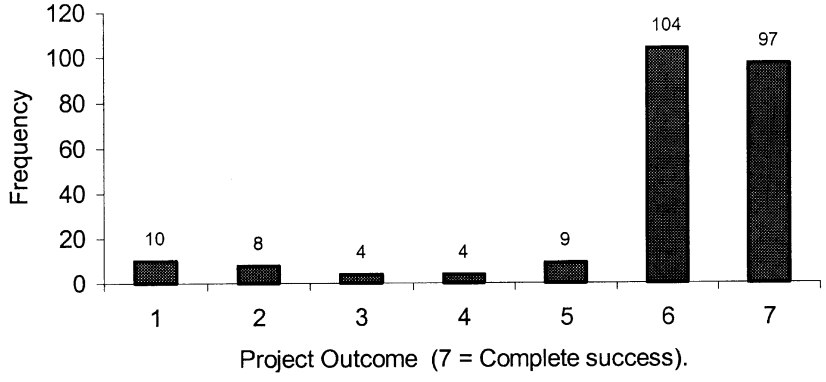

Fig. 8. Project outcome. $N=236$.

objectives and to minimise business disruption and about the project's yield in terms of business and other benefits.

3.3. Unexpected side-effects

Unexpected side-effects was another area explored by the survey. 46% (108) of respondents reported that their project gave rise to unexpected side-effects or outputs, with many of them expressing surprise that these had arisen (see Table 2). Their descriptions of the unexpected side-effects, grouped into desirable side-effects and undesirable side-effects, are displayed in Table 3. Examination of this data suggests that nearly 70% (113) of the side-effects could be attributed either directly or indirectly to lack of awareness of the environment. This may imply that many of the tools and techniques the respondents used were poor at modelling 'real world' problems or that insufficient account was taken of project boundaries and environments.

3.4. Factors critical to the project's outcome

In the section of the questionnaire exploring this area, respondents were presented with a list of 19 critical factors culled from a study of the literature [4–17] identifying or examining factors believed to be critical to the outcome of a project. They were asked to indicate which of the factors they regarded as 'critical'. Respondents were also encouraged to add any other factors they felt to be important [a further five (including 'other') were added by the respondents]. The count of factors indicated by the respondents is shown in Table 4. 'Clear goals and objectives' was the most mentioned factor, selected by 87% (206) of respondents.

Respondents were asked to indicate and rank the three factors they believed to be most critical to their project's outcome. Their responses are displayed in Table 5. From this table, it is evident that the number of times a critical factor was mentioned by respondents does not correspond to the importance given to the factor in terms of ranking. For instance, 'Realistic schedule' was the second most frequently mentioned factor (mentioned by 78% (185) of respondents) however only 7% (17) of respondents ranked it first and 11% (27) ranked it second.

As Table 5 shows, the three critical success factors mentioned most frequently by respondents to the survey were:

- Clear goals/objectives
- Support from senior management
- Adequate funds/resources

These results are similar, in large part, to those found in the literature [5,13,18]. However, there were some differences of opinion between the respondents and the prevailing wisdom in this area. For example, alongside 'project mission' and 'top management support', Pinto and Slevin [13] emphasise 'the provision of adequate communication channels and control mechanism' but

Table 1
Criteria used for judging project success

Criteria	Sum of re-coded ranking	Sums ranked
Meets client's requirements	970	1
Completed within schedule	850	2
Completed within budget	766	3
Meets organisational objectives	188	4
Yields business and other benefits	86	5
Causes minimal business disruption	71	6
Meets quality/safety standards	48	7
Other criteria	20	8

Table 2
Unexpected side-effects

Side-effects	Count
Yes (desirable)	40
Yes (undesirable)	30
Yes (both desirable and undesirable)	38
No	108
Don't know	16
Did not respond	4
Total	236

Table 3
Side-effects — descriptions — frequency of mention

Desirable side-effects	Count
Increased business/sales/opportunities	34
New understanding/knowledge gained	25
Improved business/staff relations	18
Greater consistency of working	6
Total	83
Undesirable side-effects	**Count**
Undesirable organisational impact/conflict	15
Problems with staff/client/contractors/suppliers	13
Technical limitations came to light	12
Lack of awareness of environment	12
Underestimation of cost/time	10
Changes to goal/objectives	6
Poor IT awareness/knowledge	6
Conflicting priorities	5
Total	79

Table 4
Factors critical the project's outcome — frequency of mention

Factors	Count
Clear goals/objectives	206
Realistic schedule	185
Support from senior management	176
Adequate funds/resources	164
End user commitment	159
Clear communication channels	144
Effective leadership/conflict resolution	138
Effective monitoring and feedback	135
Flexible approach to change	133
Taking account of past experience	121
Recognising complexity	121
Taking account of external influences	120
Effective team building/motivation	117
Effective management of risk	117
Training provision	98
Contextual awareness	94
Provision of planning and control systems	88
Appreciating the effect of human error	53
Considering multiple views of project	47
Having access to innovative/talented people	8
Other factor(s)	7
Having relevant past experience	3
Support from stakeholder(s)/champion(s)	3
Having a clear project boundary	2

Table 5
The three factors believed to be most critical to the project's outcome

Critical factors	1st most critical factor count	2nd most critical factor count	3rd most critical factor count	Sum of counts
Clear goals/objectives	76	40	18	134
Support from senior management	28	25	24	77
Adequate funds/resources	14	35	23	72
Realistic schedule	17	27	22	66
End user commitment	23	18	23	64
Effective leadership/conflict resolution	9	8	21	38
Flexible approach to change	7	15	12	34
Clear communication channels	4	13	16	33
Taking account of past experience	15	5	7	27
Effective management of risk	6	10	9	25
Contextual awareness	5	8	11	24
Effective monitoring and feedback	3	8	12	23
Recognising complexity	8	3	8	19
Provision of planning and control systems	3	9	7	19
Taking account of external influences	8	3	6	17
Effective team building/motivation	3	4	8	15
Training provision	2	3	3	8
Considering multiple views of project	2	0	2	4
Having access to innovative/talented people	2	0	2	4
Appreciating the effect of human error	0	1	1	2
Support from stakeholder(s)/champion(s)	1	1	0	2
Having a clear project boundary	0	0	1	1
Total	236	236	236	708

only 37% (88) respondents regarded the 'Provision of planning and control systems' to be a critical factor. Cash and Fox [6] maintain that 'successful projects always have a champion', but 'Support from stakeholder(s)/champion(s)' was only considered critical by 1% (3) of respondents. Furthermore, although it is widely argued [3,11,16,19–23] that many projects fail due to inadequate management of risk, only 49.5% (117) of respondents considered 'Effective management of risk' to be critical. Therefore, although there was agreement between the literature and the survey findings over the top three factors there was disagreement about the extent to which other factors were important determinants of success.

Interestingly, 'Having a clear project boundary' was regarded as the least important factor in relation to the outcome of a project. This may add weight to the argument put forward earlier when discussing unexpected side-effects, that insufficient account was taken of project boundaries and environments.

3.5. Methods, methodologies, tools and techniques

The section on methods, methodologies, tools and techniques presented respondents with a list of 44 options and were asked to indicate which had been used in the project being considered. The options chosen for inclusion in the list were those found in a selection of the standard text books on project management [24–38]. Again, respondents were encouraged to add to the list of options if necessary.

The 44 options provided were grouped as follows:

1. Methods/methodologies
2. Project management tools
3. Decision making techniques
4. Risk assessment tools
5. Computer models/databases/indexes
6. Computer simulations

Table 6 shows the mean, mode, range and count of the frequency of mention for the methods, methodologies, tools and techniques used. Between them respondents indicated use of a total of 1210 methods, methodologies, tools and techniques. The maximum number of methods, methodologies, tools or techniques used by any single respondent was 23, the mode was 3 and the mean was 5. 2% (5) of respondents stated that they did not use any methods, methodologies, tools or techniques whatsoever. Although 28% (66) of respondents did not use any method or methodology over 95% (225) of respondents used at least one project management tool. 52% (123) of respondents did not use any decision making techniques. 54% (128) of respondents used their own 'in house' project management method. The most commonly used project management tool (77%, 182) was 'off the shelf'

Table 6
Project management methods, methodologies, tools and techniques — frequency of use

Project management method/methodology/tool/technique	Count of frequency of use	Total used	Mean	Mode	Range
Project management methods/methodologies		206	0.87	1	3
Projects in controlled environments (PRINCE)	23				
Projects in controlled environments 2 (PRINCE2)	14				
Structured systems analysis and design methodology (SSADM)	17				
The European risk management methodology (RISKMAN)	1				
The RIBA plan of work	2				
Other project management methods/methodologies[a]	16				
In house project management methods	128				
In house similar to PRINCE	5				
Project management tools		617	2.61	1	7
Critical path method (CPM)	70				
Work breakdown structure (WBS)	75				
Cash flow analysis (CFA)	43				
Gantt bar charts	152				
Graphical evaluation and review technique (GERT)	4				
Programme evaluation and review technique (PERT)	24				
Strengths weaknesses, opportunities and threats (SWOT)	41				
Other project management tools[b]	21				
Project management software	182				
In house project management tools	5				
Decision making techniques		172	0.73	0	4
Cost benefit analysis (CBA)	88				
Decision analysis (DA)	9				
Sensitivity analysis (SA)	19				
Expressed preferences	23				
Implied preferences	11				
Revealed preferences	11				
Other decision making techniques	9				
In house decision making techniques	2				
Risk assessment tools		147	0.62	0	10
Life-cycle cost analysis (LCCA)	25				
Event tree analysis (ETA)	8				
Fault tree analysis (FTA)	6				
Probability analysis (PA)	34				
Reliability analysis	13				
Uncertainty analysis	3				
Failure mode and effect analysis (FMEA)	10				
Hazard analysis (HAZAN)	9				
Hazard and operability studies (HAZOP)	9				
Operation and maintenance risk analysis (OMRA)	4				
Preliminary hazard analysis (PHA)	5				
Other risk assessment tools	7				
In house risk assessment tools	14				
Computer models/databases/indexes		40	0.17	0	3
CRUNCH	1				
Lessons learnt files (LLF)	23				
Expert systems	4				
In house computer models/databases/indexes	12				
Computer simulations		11	0.05	0	2
Hertz	1				
Monte Carlo	10				
Other techniques		11	0.05	0	2
Other techniques	17				
All methods, tools and techniques		1210	5.13	3	23

[a] Includes other methods used in Information Systems Development Projects.
[b] Includes tools used in Information Systems Development Projects.

software. 64% (152) of respondents used Gantt charts, 37% (88) of respondents used Cost Benefit Analysis.

Looking at these findings in relation to those reported elsewhere it is worth noting the similarity between this study and that of Baldry [39]. In his report of a survey of practitioners' use of risk analysis and management techniques, he commented on the large width of the range of techniques used. As can be seen from Table 6, risk analysis was the area where the number of different tools used was highest. However, it is also worth noting Humphreys' submission [40] that only a small number of project managers use risk assessment tools because only a few of the tools provide support for the management of risk. This may provide an explanation as to why 65% (154) of respondents to the survey did not use any risk assessment tools.

3.6. Limitations and drawbacks of the methods, methodologies, tools and techniques used

42% (99) of respondents said they had encountered limitations or drawbacks with the methods, methodologies, tools or techniques they had used. Those they cited (23 respondents cited two methods/tools/techniques each) are listed in Table 7. In total, limitations were reported in connection with 10% (122) of the 1210 methods, methodologies, tools and techniques used. 'Project Management Software' was reported the highest number of times. Table 8 shows the methods and tools with the highest frequency of reported limitations as a percentage of their frequency of use.

The respondents' descriptions of the limitations or drawbacks experienced have been grouped into twelve categories and are presented in Table 9.

A cross-tabulation of the methods, methodologies, tools and techniques with limitations and the descriptions of the limitations is given in Table 10. It is worth noting that of the 56 respondents who experienced problems with 'Project Management Software', 26 found the software 'Inadequate for complex projects'. It is also worth noting that 'In House Project Management Methods', which was the fourth most frequently cited (expressed as a percentage of frequency of use) as possessing limitations, was criticised for a wide variety of reasons.

The most frequently described limitation was 'Inadequate for complex projects' (32 cases). 26 of these cases referred to 'Project Management Software'. One factor that may lie behind this finding has been identified by Cotterell [41]. He found that only a few software packages included the facility to track shared resources. This must constrain the accurate modelling of complex projects.

Table 8
Methods and tools with the highest frequency of reported limitations

Methods/tools with limitations	Frequency of use	Frequency of reported limitations	Frequency of limitations as a % of frequency of use
Project management software	182	56	31
Structured systems analysis and design methodology	17	5	29
PRINCE and PRINCE 2	37	9	24
In house project management methods	128	18	14

Table 7
Methods, methodologies, tools or techniques with limitations — frequency of mention

Method/methodology/tool/technique with limitations	Count
Project management software	56
In house project management method	18
Project management tool	10
PRINCE	7
Structured systems analysis and design methodology	5
Method/tool used in software development projects	5
Other techniques	5
Project management methods	4
Risk assessment tool	4
PRINCE 2	2
Decision making technique	2
In house risk assessment tool	2
In house project management tool	1
In house computer model/database/index	1
Total	122

Table 9
Description of limitations or drawbacks — frequency of mention

Description of limitation/drawback to method/ methodology/tool/technique	Count
Inadequate for complex projects	32
Difficult to model 'real world'	18
Too heavy in documentation, too time consuming	12
Other	11
Failed to predict problems	9
Constrained activities, did not allow a holistic view	9
Too unwieldy, not cost effective	9
Lack of training/ expertise, etc.	6
Not suitable — no suitable tools available	5
Too much emphasis on following the 'standard'	5
Not fully developed/ immature	4
Lessons learnt in past not carried forward	2
Total	122

Table 10
Cross tabulation — methods, methodologies, tools and techniques with limitations and a description of the limitations

Method/tool/technique with limitation	Description of limitation to method/tool/technique												
	Difficult to model 'real world'	Failed to predict problems	Inadequate for complex projects	Lack of training/ expertise, etc.	Lessons learnt in past not carried forward	Not suitable — no suitable tools available	Not fully developed/ immature	Too heavy in documentation, too time consuming	Too much emphasis on following the standard	Con-strained activities, did not allow a holistic view	Too unwieldy, not cost effective	Other	Total
PRINCE				2				3		1	1		7
PRINCE 2									1			1	2
SSADM			1	1			1			1		1	5
Project management method	2					1			1				4
In house project management method	1	2	1	1	1	1		3	3	4	1		18
Project management software	11	2	26	2				5		3	6	1	56
Project management tool	3	1	1				1					4	10
In house project management tool						1							1
Decision making technique						1						1	2
Risk assessment tool		1				1					1	1	4
In house risk assessment tool								1				1	2
In house computer model/database/index					1								1
Method/tool used in software development projects			3				2						5
Other techniques	1	3										1	5
Total	18	9	32	6	2	5	4	12	5	9	9	11	122

4. Conclusion

This paper reports on the results of a recently conducted survey that attempted to capture the 'real world' experiences of project managers with a view to:

- identifying any common criteria used for defining project success;
- exploring the extent to which projects give rise to unexpected side-effects;
- establishing a common list of 'critical success factors';
- identifying the methods, methodologies, tools and techniques in current use in the field of project management;
- identifying any limitations or drawbacks to the methods, methodologies, tools and techniques.

The three criteria used for judging project success most cited in the literature (on time, to budget, to specification) were also the highest ranked success criteria identified in the survey. However, they were not the sole criteria by which project outcome was judged; the fit between the project and the organisation and the consequences of the project for the performance of the business were also reported as important criteria.

A remarkably high proportion (41%) of projects were judged to be a complete success but 46% were described as giving rise to unexpected side-effects but it should be noted that 14% (34) of the projects that gave rise to unexpected side-effects were among those considered to be a complete success.

Three of the four top ranking factors respondents identified as critical to project success mirrored the success criteria (realistic schedule, adequate funds/resources, clear goals/objectives). 'Support from senior management' was the other most frequency mentioned critical factor.

Between them, respondents used 1210 methods tools and techniques. The most widely used were 'Project Management Software' and 'Gantt Charts'. The mode number of tools used was 3. 66 respondents did not use any method or methodology, 123 respondents did not use any decision making techniques and 154 respondents did not use any risk assessment tools. 128 respondents used their own 'in house' project management method. 99 respondent said they had encountered limitations or drawback with the methods, tools or techniques they had used. 'Project Management Software' was reported as the tool with the most limitations and was identified as being particularly unsuitable for use with complex projects.

Following this survey, work is in hand to carry out a real-time study of two projects with a view gaining a greater understanding of the effects of the various interacting processes and decisions that take place

throughout the life of a project, thus building up a more holistic view of project management.

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