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How can IS/IT projects be measured for success?

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The common assessment of success on Information Systems/Information Technology (IS/IT) projects is that it is delivered on time, to budget and it meets the specification. However, this is taking a very narrow view of criteria and how a project is measured. The criteria for success is much wider, incorporating the views of all stakeholders in the project. This paper examines the limited research on the issue and develops a set of criteria appropriate to all IS/IT projects, using research as illustrations. However, not all the criteria will be appropriate on all projects. Project managers must agree the criteria with the stakeholders and apply appropriate factors to deliver that success criteria. © 1997 Elsevier Science Ltd and IPMA

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There has been little attempt in the past to define the criteria for success. Consequently, IS/IT projects have in many cases perceived to have failed. The success criteria proposed have been limited by the fact that not all the views of project stakeholders have been considered. However, the criteria will vary from project to project depending on a number of issues (for example, urgency, cost, functionality, quality, profit). The project team need to agree the criteria before embarking on the project otherwise different members will find themselves travelling in different directions and one or more of the team members will perceive the project to be a failure. This paper examines the literature available on success criteria and proposes a more comprehensive list. The author's research into the subject of success criteria on IS/IT projects is reported, showing that there are differences between the perceptions of success and what constitutes a successful project. Finally, conclusions are drawn regarding the steps that need to be taken to achieve a better success rate in implementing IS/IT projects.

Success criteria

Many authors have suggested time, cost and user specification as success criteria^{1–6} where project managers have to aim for satisfaction for these three criteria to achieve project success. Turner⁷ identifies *on time, within budget and to specification* as the standard mnemonic for judging success. However, as Turner suggests, this measure is primarily a view of the contractor. The criteria needs to take account of all parties in the development process.

However, there have been other definitions. A successful project, as defined by Powers and Dickson⁸ in

their research of MIS projects, met time, cost, user satisfaction (meeting information needs) and the impact on computer operations. Other authors^{9,10} have defined success as meeting time, cost and technical performance. Other success criteria discussed are: meeting quality levels, within the scope of corporate culture and values and meeting post-audit analysis.^{11,12}

Baker *et al.*¹³ point out that the perceived success is of paramount importance to the eventual success of IS/IT projects. The implication is that if projects do not meet time, budget and specification they will be seen as failures but projects can still be successful even if they have not met timescales and budget. Morris and Hough¹⁴ cite the Thames Barrier project which took twice as long to build and cost four times the original budget, but provided a profit for most contractors. It was considered a success. Furthermore, projects can also be measured in varying degrees of success. Very often success and failure is seen as 'black and white'. However, projects may not always be seen as completely successful or complete failures and different participants may see the outcome of the same project in a different way.^{14,15} Furthermore, the stakeholders need to address both the 'process' and the 'product'. Very often there is little distinction between the two.

Therefore, are these criteria of time, budget and specification the sole criteria? Are people not identifying the correct success criteria from the outset, or concentrating on the wrong critical success factors? There is the need to identify how IS/IT projects, and their products, are judged to be successful and what factors are important in influencing that success.

A computerised stock control system can be delivered on time, within budget and to user requirements.

It can be user friendly and meet all requirements at the outset of the project (and any changes throughout the project—how ever many there may have been!). However, if it does not reduce the amount of stock held in the warehouse, has it achieved its purpose? The answer must be no, at least in terms of the product, and users and/or sponsors will judge the project as a failure. Consequently, what are the criteria for judging the successful implementation of an IS/IT project? There seems to be no conclusion on the success criteria. Cost is a concern, particularly in recessionary times. There are, of course, projects where timescales are important but success can be perceived in other, more subjective, ways.

Baker *et al.*¹³ gave a definition of success, incorporating issues as technical performance and satisfaction among various key people on the project: clients, project team and users. What is important in this definition is the recognition that all people in the development process need to be satisfied at the outcome of the project, what is termed 'perceived success of a project'. To include only time, cost and specification as the only criteria is to simplify the definition. Consequently, a more detailed definition is needed.

Morris and Hough,¹⁴ in their study of the performance of a number of major projects, identified four criteria for success (see *Table 1*).

They point out that the evaluation of success criteria varies over time and that some judgement on a successful project can only be made at the end of a project (sometimes many years after the project has been implemented if a cost/benefit analysis has been carried out and the project does not show a profit for a number of years after implementation). Other criteria can be assessed throughout the duration of the project.

Turner⁷ supports this view but identifies a more extensive list for judging success (see *Table 2*). He notes that many of these criteria are subjective, with only time and cost being objective. However, these two lists do not fully address the issue of criteria for IS/IT projects. There are differences between such projects as opposed to construction projects, particularly as there is far more emphasis placed on the subjective issues (of quality, for example). Some projects are carried out by organisations for the open marketplace. These projects should be profitable for all parties concerned. Therefore, a success criteria of "the project is a profitable or a commercial success" can be added. A project to develop a particular package (for example, an accounting system, a payroll system) may be delivered on time, to specification, to budget, it satisfies the need of all interested parties but the system may not be a commercial success or it may not be profitable and consequently it will be judged as unsuccessful. This is an instance of a close connection between the 'process' and the 'product'. Any delay or overspend may mean the the product misses a potential market and impacts on its

Table 1 Success criteria (Morris and Hough¹⁴)

- the project delivers its functionality;
- the project is implemented to budget, on schedule and to technical specification;
- the project is commercially profitable for the contractor;
- in the event of a cancelled project, was the cancellation made on a reasonable basis and was the project terminated efficiently.

Table 2 Success criteria (Turner)

- it achieves its stated business purpose;
- it provides satisfactory benefit to the owner;
- it satisfies the needs of the owner, user and stakeholders;
- it meets its prestated objectives to produce the facility;
- the facility is produced to specification, within budget and on time;
- the project satisfies the needs of the project team and supporters.

ability to be commercially successful. However, profitability is not the whole story. The project must achieve its purpose and realise the business benefits required of it, in terms of efficiency, effectiveness or new business.¹⁶ The benefits and any business changes which enable those benefits to be realised must be defined at the outset and measured post-implementation in order to determine their delivery and improve the appraisal of any IS/IT investment.¹⁷

The definition of success (time, cost, specification) as a standard measure of success is accepted by Kerzner¹⁸ and that it has pertained since the 1960 s. However, he expands this definition of success criteria by acknowledging that the project must be acceptable to the customer/user but adds that the project must be completed:

- with the minimum or mutually agreed upon scope change;
- without disturbing the main flow of work of the organization;
- without changing the corporate culture.

Agreement is an important facet of the success criteria.¹⁹ Block²⁰ went some way to defining success criteria by stating what he believed to be a successful system. The two important areas that Block addressed was, firstly, the necessity to satisfy the needs the users of the project. However, users are not the only interested parties in a project. There are sponsors, the technical participants and other stakeholders.²¹ Secondly, he addressed the aspect of the 'quality' of the system—does the project meets quality thresholds and constraints?

Much has been written on the subject of quality which is seen as a very subjective issue.^{22–25} The current industry definition of quality is 'Fitness for purpose'. However, it is impossible to give a standard definition of quality. Different people will define quality in different ways. Block²⁰ identified two definitions of quality—reliability and maintainability. There are many more—for example, usability, efficiency.²⁶ What needs to be done is for the different stakeholders to agree the required quality and measure it²⁷ using a consistent and standard approach.²⁸

Briner *et al.*²⁹ classified the criteria has either 'hard' (tangible and quantitative) or 'soft' (intangible and qualitative). Although their list of 'hard' and 'soft' criteria was not exhaustive, they recognised the importance of defining the success criteria for the project and that the project leader must discuss with the client and end-user at the start of the project in order to ascertain the 'soft' and more subjective criteria.

What this clearly shows is that very few people (except Turner,⁷ Morris and Hough,¹⁴ Kerzner,¹⁸ Keen,¹⁹ Briner *et al.*²⁹ and, to a lesser extent, Block²⁰) in the past have thought seriously about the success criteria. The established criteria have been used to identify whether a project has been a success. If it does not meet time, budget and user specification, it will be

Table 3 Success Criteria

- it is profitable for the sponsor/owner and contractors;
- it achieves its business purpose in three ways (strategically, tactically and operationally);
- it meets its defined objectives;
- it meets quality thresholds;
- it is produced to specification, within budget and on time;
- all parties (users, sponsors, the project team) are happy during the project and with the outcome of the project.

judged as a failure. However, there are instances where these three criteria have not been met and projects have still been perceived as successful. Furthermore, there has not been the recognition that the success criteria needs to be defined at the outset of the project.

The list of criteria could, therefore, be extended (see *Table 3*). Time, cost and specification are important for many IS/IT projects but they are only a small part of the measurements. These focus on the 'process' whereas the 'product' is just, if not more, important in judging success. Projects must also deliver the required benefits, must meet required quality thresholds, be profitable (although delays and overspend could impact on the commercial success of the project) and satisfy the needs of all stakeholders. The emphasis on the individual criteria will vary depending on the type of project²⁹ and different stakeholders will have conflicting aims on different projects.³⁰ Therefore, there may a different weighting of criteria on each project.

In order to test the list of criteria and to assess which criteria are important to the different stakeholders in the project, research was carried out between 1992 and 1994 investigating the perceptions of project success from different viewpoints.

Research methodology

An extensive questionnaire and subsequent in-depth interviews were carried out. 132 questionnaires were completed and returned on the success criteria and the factors which were employed to deliver that criteria. Respondents were asked to indicate the five most important criteria for success on particular projects. They were able to qualify their responses and add other criteria (if appropriate). Follow-up interviews were carried out with different participants—project managers, sponsors, users and systems analysts—on 12 IS/IT projects, looking at the criteria for success and whether

different participants viewed the project in different ways.

Research observations

There were major differences of opinion regarding the criteria for success and conflicting views on what is perceived as criteria.^{26,31} As can be seen from *Figure 1* the six most important criteria across all respondents and all projects were:

- meets user requirements;
- achieves purpose;
- meets timescale;
- meets budget;
- happy users;
- meets quality.

The results from all respondents on all projects would appear to be predictable, accepting the fact that the highest number of respondents were project managers. Budget, timescale and user requirements appear to be still extremely important in judging the success of IS/IT projects. In the economic climate of the late 1980s and early 1990s any development of an IS/IT project needed to show tangible and quantifiable benefits early in its operational life. If the project is delayed or costs more than budgeted, the benefits defined in the cost/benefit analysis exercise are unlikely to be realised in the period required by senior management in the organisation. Budget and time are determinants also of commercial success and any delay or overspend would impact on the commercial success of the project. More importantly, criteria other than that proposed in *Table 3* were rarely mentioned (less than 1.5% of the total). This would indicate that the respondents recognised that the criteria proposed in the questionnaire were valid and appropriate for project measurement.

If the results on success criteria are analysed from the viewpoint of users and project managers, there is a different emphasis (see *Figures 2* and *3*). Users feel that the system delivered should meet their requirements and that they should be happy with the system. Although achieving timescales and budgets were important, other criteria were more important. Users will not particularly perceive a project as having failed if it is implemented a few weeks late and cost a few thousand pounds more than budgeted. However, if the sys-

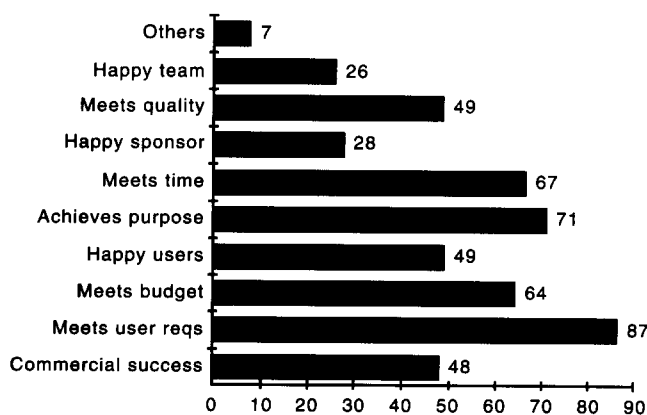


Figure 1 Criteria for success (all respondents/all projects—% frequency of mention)

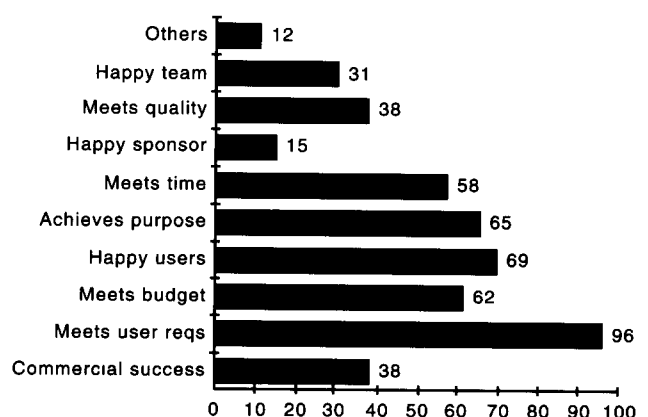


Figure 2 Criteria for success (users on all projects—% frequency of mention)

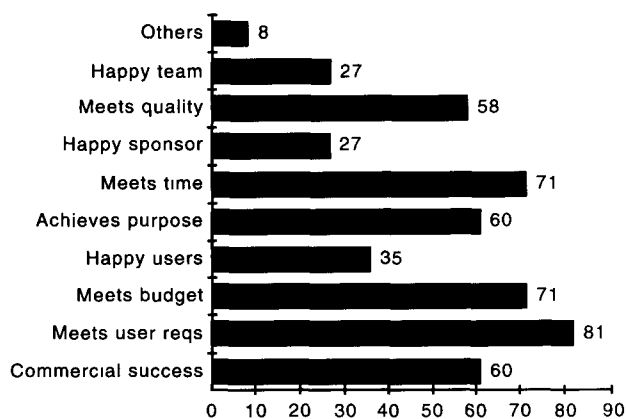


Figure 3 Criteria for success (project managers on all projects)—% frequency of mention)

tem does not work and the users are not happy, the project will be remembered as a failure and users will be reluctant to readily involve themselves in another IS/IT project. Furthermore, users will have performance objectives (such as response times and reliability) and those performance objectives will need to be met. Users will not be happy if they are not! Project managers, on the other hand, view the commercial success of a project and meeting quality (or their definition of quality) as more important criteria than do users. Cost, time user requirements are still extremely important criteria for success as perceived by project managers.

The conclusion from the results indicates that project managers are focusing on the short-term criteria relating to the project 'process' and concentrating on meeting the time and budget constraints which are set by senior management as opposed to the longer-term criteria relating to the 'product' such as delivering a system with which the users are happy. The reason for project managers' emphasis on these criteria is often because they are appraised by their superiors on their ability to deliver projects within these time and budget constraints. Therefore, they plan and monitor the project exhaustively in their attempt to deliver projects which meet time, budget and specification. This is, in their eyes, the sign of a successful project.

With the desire to achieve time and cost constraints, project managers do not put great emphasis on the users being happy with the system. This is further emphasised by the results from systems analysts where again 'meeting user requirements' was extremely important but 'happy users' was not a major success criteria. This leads us to the conclusion that project managers and systems analysts implement their interpretation of user requirements and not the users' interpretations. They produce a system whether the users like the system or not.

If we look at the results for failed and successful projects between users and project managers (see Table 4), we see there is a distinct emphasis by project managers for meeting timescales and budgets on failed projects. On the other hand, on successful projects they are focusing on the commercial success (time, budget and functionality) and quality constraints. Users are more concerned that their requirements are met and that they are happy with the project.

There appears to be a greater agreement on the criteria on successful projects than on those projects which were perceived as having failed. However, it is clear that different criteria will be important on different projects. It is necessary to agree the criteria at the outset and all participants need to work towards achieving the criteria for the project to be perceived as successful by all parties. If the boundaries of the project are understood and agreed and if there can be greater convergence of the criteria by all parties in the project, there will be a greater chance of success. Agreeing the criteria at the outset of the project would be one way of achieving that convergence.

The conclusion must inevitably drawn that the fixation, on the part of project managers particularly, to satisfying timescale and budget constraints, at the expense of other criteria, is leading to the failure of IS/IT projects. It may also be the case that project managers are applying the wrong factors, or simply applying the right factors badly (such as too much detailed planning, not enough high level planning) to achieve the success criteria instead examining and controlling the products and user functionality (by employing configuration management).

The success criteria must be defined and agreed at the outset of the project, although this may be very

Table 4 Five major criteria for success

Users criteria	%	Project managers criteria	%
All projects			
Meets user requirements	96	Meets user requirements	81
Happy users	69	Meets budget	71
Achieves purpose	65	Meets time	71
Meets budget	62	Commercial success	60
Meets time	58	Achieves purpose	60
Successful projects			
Meets user requirements	96	Meets user requirements	86
Happy users	71	Commercial success	71
Meets budget	71	Meets quality	67
Meets time	67	Meets budget	62
Achieves purpose	57	Achieves purpose	62
Failed projects			
Meets user requirements	100	Meets budget	83
Achieves purpose	100	Meets time	78
Happy users	67	Meets user requirements	78
Happy team	67	Commercial success	61
Commercial success	67	Meets quality	56

difficult. The criteria identified undoubtedly will be conflicting between different project participants. There will in many cases inevitably be trade-offs³² and these trade-offs must be agreed by all parties before the project is started. Tuman²¹ advocates that the project team can focus its energy on particular parties who have a major impact on project success. This can be a useful technique in the early stages of a project to, firstly, identify the stakeholders and, secondly, to rank their power and influence on the project. However, there is a grave danger for project managers and project teams to concentrate their efforts on satisfying a 'few' major players and play down the importance of other personnel on the project. However, if project managers can identify the stakeholders that have a major impact on success, then efforts and resources can be better focused. The importance of Tuman's ideas is that the success criteria must be established, defined, measured and evaluated.

Conclusion

It is not enough to simply suggest that a project is a success if it is delivered on time and to budget. Project managers' success is very often judged on their ability to deliver IS/IT projects on these objective criteria in the short-term. Their future career may depend on it. However, this may not be the users' and sponsors' perceptions. Users may be more concerned about being happy with the implementation in the longer-term. On the other hand sponsors may be more concerned about the project delivering the strategic benefits. Therefore, each project must have a start-up activity to define the success criteria, to identify the project objectives and constraints, to organise the project team and to strategically plan the project (Turner *et al.*³³). The importance of, and procedures for, an effective project start-up were described by Fangel.³⁴ Only when the success criteria has been defined can project managers consider the appropriate factors to deliver that criteria. In the past success criteria and success factors have been examined in isolation but the mistake many project managers have been making is to concentrate on the success factors without first identifying the criteria. Project managers must get agreement from all stakeholders on the criteria for success through better communication, particularly on the more subjective issues, and then, and only then, can project managers decide on the factors necessary to deliver success.

References

1. Rook, P. Controlling software development projects. *Software Engineering Journal*, 1(1), 1986, 7-16.
2. Selin, G., Organizational support: Building a Framework for Project Success *PMI Seminar/Symposium, Oct 7-11 1989*, pp. 217-221.
3. Blaney, J., Managing Software Development Projects. *PMI Seminar/Symposium, Oct 7-11, 1989*, pp. 410-417.
4. Weitz, L. How to implement projects successfully. *Software Magazine*, 9(13), 1989, 60-69.
5. Redmill, F. J. Considering quality in the management of software-based development projects. *Information and Software Technology*, 32(1), 1990, 18-22.
6. Wallace, D. Get it done!—Project management your most valuable tool. *Success*, 30, 1990, 46-47.

7. Turner, J. R., *The Handbook of Project-based Management*. McGraw-Hill, 1993.
8. Powers, R. F. and Dickson, G. W. MIS project management: Myths, opinions and realities. *California Management Review*, 15(3), 1973, 147-156.
9. Might, R. J. and Fischer, W. A., The role of structural factors in determining project management success. *IEEE Trans on Engineering Management*, 1985, EM-32, 71-77.
10. Larson, E. W. and Gobeli, D. H. Significance of project management structure on project success. *IEEE Trans on Engineering Management*, 36(2), 1989, 119-125.
11. Cleland D. I., Measuring success: The owner's viewpoint. In *Measuring Success*, ed R. Brunies and P. Menard. PMI, 1986, pp. 85-94.
12. Stuckenbruck, L. C., Who determines project success. In *Measuring Success*, eds R. Brunies and P. Menard. PMI, 1986.
13. Baker, B. N., Murphy, D. C. and Fisher, D., Factors affecting project success. In *Project Management Handbook*, eds Cleland and King. Van Nostrand Reinhold, 1983.
14. Morris, P. W. G. and Hough, G. H., *The Anatomy of Major Projects*. John Wiley, 1987.
15. DeCotiis, T. A. and Dyer, L. Defining and measuring project performance. *Research Management*, 16, 1979, 17-22.
16. Remenyi, D., Money, A. and Twite A., *A Guide to Measuring and Managing IT Benefits*. NCC Blackwell, 1991.
17. Ward, J., Taylor, P. and Bond, P. Evaluation and realisation of IS/IT benefits: An empirical study of current practice. *European Journal of Information Systems*, 4, 1996, 214-225.
18. Kerzner, H., *Project Management*. Van Nostrand Reinhold, 1989.
19. Keen, J. S., *Managing Systems Development*. John Wiley, 1981.
20. Block, R., *The Politics of Projects*. Yourdon Press, 1983.
21. Tuman, J., Models for Achieving Success through team building and Stakeholder Management. In *The AMA Handbook of Project Management*, ed P. C. Dinsmore. AMACOM, 1993.
22. Crosby, P. B., *Quality is Free*. McGraw-Hill, 1979.
23. Deming, W. E., *Quality, Productivity and Competitive Position*. MIT, Center for Advanced Engineering Study, 1982.
24. Crosby, P. B., *Quality without Tears*. McGraw-Hill, 1984.
25. Delgado, R. F. Planning for quality software. *SAM Advanced Management Journal*, 57(2), 1992, 24-28.
26. Wateridge, J. IT projects: A basis for success. *International Journal of Project Management*, 13(3), 1995, 169-172.
27. Whitten, N., *Managing Software Development Projects*. John Wiley, 1990.
28. Yeates, D., *Project Management for Information Systems*. Pitman 1991.
29. Briner, W., Hastings C and Geddes, M., *Project Leadership*. Gower, 1996.
30. Munns, A. K. and Bjeirmi, B. F. The role of project management in achieving project success. *International Journal of Project Management*, 14(2), 1996, 81-87.
31. Wateridge, J., Delivering successful IS/IT projects: 8 key elements from success criteria to implementation via management, methodologies and teams. Ph D thesis, 1996.
32. Meredith, J. R. and Mantel, S. J., *Project Management, a managerial approach*. John Wiley, 1989.
33. Turner, J. R., Grude K. and Thurloway, L., *The Project Manager as a Change Agent*. McGraw-Hill, 1996.
34. Fangel, M., *The Handbook of Project start-up How to launch projects successfully*. Internet, 1987.

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