

Project Size and Categorisation

The ability to efficiently manage new projects is directly affected by an organization's ability to remember past successes and learn from past challenges¹. This requires a logical, organised categorisation process for both projects and programs².

A categorisation system should consider both the type of project (usually based on some form of classification – see below) and its inherent degree of difficulty measured along four dimensions.

The Four Dimensions of Project Difficulty

There are four basic dimensions that affect the difficulty of managing every project:

- Its inherent size usually measured in terms of value;
- The degree of technical difficulty in creating the output (complication) caused by the characteristics of the project's work and its deliverables, or the time-frame the deliverables are required within;
- The degree of uncertainty involved in the project; and
- The complexity of the relationships ('small p' politics) both within the project team and surrounding the project.

The difference between how complicated the work is and complexity is that managing complicated work (ie, work with a high level of technical difficulty) is achievable by implementing appropriate systems such as quality management and configuration management. The consequences of technical difficulty are definable, predictable and manageable with the right people. The essence of complexity is that the future of any complex system or set of relationships is inherently unpredictable.

Whilst all of these factors impact on the degree of difficulty associated with successfully managing the delivery of the project, the Project Manager can only significantly influence, as opposed to manage, the last two elements. Reducing the degree of uncertainty and enhancing the relationships with and between project stakeholders (including the project team)³ to reduce complexity.

One should also note there is a significant difference between a program and a project and the associated skill set required by their respective managers. These issues are discussed in *Understanding Programs and Projects - There is a difference!*⁴

Project Size

The size of the project or program will impact the degree of difficulty in achieving its objectives but large projects are not necessarily complicated or complex. There are projects in Australia to shift millions of cubic meters of overburden from mine sites with expenditures rising to several \$million per day but the work is inherently simple (excavating, trucking and dumping dirt), and the relationships in and around the project are relatively straight forward; the management challenges are essentially in the area of logistics. One only has to contrast this type of mega project with the difficulties of successfully delivering a small culture change

¹ For more on **Lessons Learned** see: http://www.mosaicprojects.com.au/WhitePapers/WP1004_Lessons_Learned.pdf

² For more on **program typology** see: http://www.mosaicprojects.com.au/WhitePapers/WP1022_Program_Typology.pdf

³ For more on **Stakeholder Management** see: <http://www.stakeholder-management.com>

⁴ See: *Understanding Programs and Projects* - http://www.mosaicprojects.com.au/Resources_Papers_078.html and WP 1002 *Differentiating Programs from Projects*: http://www.mosaicprojects.com.au/WhitePapers/WP1002_Programs.pdf



within an established bureaucracy (say a new timesheet system) to appreciate size is only one dimension of a project.

However, size becomes the defining factor in 'mega projects'. Mega projects aren't big projects, they are major, complex programs of work usually with a special purpose 'financial vehicle' at its core⁵. Managing this scale of project is in a different league to simply managing a 'big project'. Managing the complexity (politics and stakeholder engagement) is central to success, as is breaking the overall program down into a series of smaller projects run in parallel. Managing mega projects successfully is a specialist area of study⁶.

Technical Difficulty (degree of complication)

The technology, and technical difficulty associated with any project is a combination of the work needed to accomplish the project's objectives (particularly time) and the characteristics of the output (product, service or result) being produced⁷. It should be obvious that complicated *high tech* projects are inherently more difficult to manage than simple projects.

The technical difficulty innate in the work of the project is compounded by time pressures; a technically difficult project with adequate time allowed for research and prototyping can be easier to manage than a relatively simple project required in an unusually short timeframe. An accelerated completion target will increase costs and has the potential to reduce quality unless a highly competent management team are in place, and even then project risk is increased.

The technology also dictates the type of people engaged in the work which has a significant effect on how the work is managed and the management approach that will work best (and consequently the best person to manage the work). The best way to motivate and direct 'rocket scientists' engaged in a research project differs from that needed for 'white collar' workers engaged in an IT development and both differ substantially from the procurement focus of a heavy engineering project.

The nature of the technical difficulties and the associated degree of certainty/uncertainty largely depend on how well the work is understood. *Bleeding edge* research has a far higher level of uncertainty associated with every aspect of its management than a project of similar technical difficulty that has been undertaken several times before. The degree of understanding of both the project's characteristics and the way they will be accomplished on the part of the project's client is as important to the success of the project as the understanding of the project team. The lower the levels of knowledge, the more difficult it is to achieve a successful project outcome that delivers the benefits expected by the client. This lack of knowledge will lead to:

- Less accurate estimates of activity duration, sequence and resource requirements;
- Less certainty the project scope contains 100% of the required work; and
- Greater needs for updates and modifications to the overall project plan to maintain relevance.

Paradoxically, the less that is known about the overall work of the project, with the associated reduction in accuracy, the more important project control tools such as the schedule become as a means for guiding the execution of the work and managing change.

⁵ For more on **program typology** see: http://www.mosaicprojects.com.au/WhitePapers/WP1022_Program_Typology.pdf

⁶ For more on **managing mega projects** see: <http://www.sbs.ox.ac.uk/faculty-research/megaproject-management>

⁷ The characteristics of construction projects are defined in a multi-dimensional BIM model. For more on BIM see: http://www.mosaicprojects.com.au/WhitePapers/WP1082_BIM_Levels.pdf



Uncertainty

The degree of uncertainty associated with the desired output from the team’s endeavours has a major impact on the management of the project. This is different to the issues around *bleeding edge*, technically complicated projects discussed above. One measure of uncertainty developed by Eddie Obeng measures how much is known about what has to be achieved and how much is known about the methods of achieving the outcomes. The four options are detailed below.

When a bleeding edge project has a clearly defined end point you are on a *quest* the challenge is finding the optimum route to the end. When the end point is unclear you are either *making a movie* – the process are well known but the outcome is uncertain or on a *walk in the fog* where neither the route nor the outcome are defined⁸. This is not an issue as long as all of the project stakeholders appreciate they are on a journey to initially determine what success looks like, and then deliver the required outputs.

The less certain the client is of its requirements, the greater the uncertainty associated with delivering a successful project and the greater the effort required from the project team to work with the client to evolve a clear understanding of what’s required for success. Budgets and timeframes are expected to change to achieve the optimum benefits for the client; and the project is set up with an appropriately high level of contingencies to deal with the uncertainty. Problems occur if the expectations around the project are couched in terms of achieving an ‘on time, on budget’ delivery when the output is not defined and the expected benefits are unclear⁹. Managing uncertainty is closely associated with and influences the complexity of the relationships discussed below.

Unclear	<p>Semi-Open or Making a Movie</p> <ul style="list-style-type: none"> Stakeholders are very sure about how the project is to be done Stakeholders are unsure of what is to be done The organisation is clear about the method to be used and has the expertise It needs to spend time defining what 	<p>Open or Lost in the Fog</p> <ul style="list-style-type: none"> Stakeholders are unsure what is to be done Stakeholders are unsure how the project is to be done The organisation is attempting to do something not been done before The organisation needs to spend time defining what and how
	<p>Closed or Painting by Numbers</p> <ul style="list-style-type: none"> Stakeholders are sure about what is to be done Stakeholders are very sure about how the project is to be done The organisation is going through a repetitive project and knows the skills needed Written procedures, methods and systems are available to replicate what has been done in the past 	<p>Semi-closed or Going on a Quest</p> <ul style="list-style-type: none"> Stakeholders are sure about what is to be done Stakeholders are unsure how the project is to be done The organisation needs to spend time on defining how
Clear	Clear	Unclear

Source: Obeng E (1994) *The Project Leader’s Secret Handbook*. Financial Times Prentice Hall

⁸ For more see **Projects aren’t Projects**: <http://mosaicprojects.wordpress.com/2009/04/09/projects-arent-projects2/>

⁹ For more see: **Avoiding the Successful Failure** - http://www.mosaicprojects.com.au/Resources_Papers_046.html



Complexity = The People

This aspect of a project is unpredictable and centres on the effectiveness of the relationships within the project team and with the external stakeholder community, this aspect is compounded if the project work involves a complex 'system of systems' that embeds innate complexity within the work.

Complexity Theory¹⁰ has become a broad platform for the investigation of complex interdisciplinary situations and helps understand the social behaviours of teams and the networks of people involved in and around a project. These ideas apply equally to small in-house projects as to large complicated programs. In this regard, complexity is not a synonym for complicated or large¹¹. Effective stakeholder management¹² is the key to obtaining the commitment needed to effectively deliver the project both from within the project team and from the key stakeholders.

Highly complex (extreme) projects appear to be in a different category; they cannot be fully planned because the scope and requirements evolve over time as stakeholder attitudes and knowledge evolve (requiring iterative planning); but political and commercial pressures require as much certainty as possible 'upfront'. The successful management of this type of 'complex projects' is an emerging area of study in its own right; developments to date include the creation of a set of competencies required by a person charged with managing a complex project¹³ which augment, reframe and extend those needed by a successful project manager running a 'normal project'.

Project Categorisation System

The categorisation system should provide useful insight about differences between projects in one category and projects in every other category, and be readily translatable and comprehensible across the organisation. Project types seen as particularly important in the broad project management categorization context¹⁴ are:

- Organizational change.
- Engineering/construction.
- Information technology.
- New product development.
- Research and development.

These basic 'types' can be further subdivided by application sector, for example, Aerospace, Events or International Developments (this list can be very extensive); as well as by geographic location.

A project categorisation system should provide an appropriate category for any project the organisation may encounter by considering a range of five or six attributes drawn from:

- Some form of classification for different types of project based on an appropriate standard industry classification¹⁵ or application area;

¹⁰ For more on **Complexity Theory** see: http://www.mosaicprojects.com.au/WhitePapers/WP1058_Complexity_Theory.pdf

¹¹ For further discussion see: **A Simple View of 'Complexity' in Project Management** - http://www.mosaicprojects.com.au/Resources_Papers_070.html

¹² For more on **stakeholder management** see: http://www.mosaicprojects.com.au/WhitePapers/WP1007_Stakeholder_Cycle.pdf

¹³ For more on **complex project management** see: <http://iccpm.com/>

¹⁴ Source: Series on *Categorizing Projects and Programs*, PM World Journal Vol. III, Alan Stretton.



- The stage in the product's lifecycle, R&D, Development, Implementation, Operations, Maintenance;
- The purpose of the project from the performing organisation's perspective¹⁶;
- Alignment with different aspects of the organisation's strategy
- The project's 'importance' and or 'urgency';
- Geographic location;
- The form of contract or relationship with clients, suppliers and contractors: Alliance, Partnership, Joint Ventures, traditional, etc.;
- Sources of funding and/or types of ownership;
- Distinguishing between normal, complex and mega projects¹⁷;
- The degree of difficulty based on four dimensions outlined above.

For a more detailed discussion on categorisation and its uses in knowledge management, training and other aspects of managing an organisation that 'does projects, see:

<https://www.pmi.org/learning/academic-research/project-categorization-systems>

This White Paper is part of Mosaic's **Project Knowledge Index** to view and download a wide range of published papers and articles see: http://www.mosaicprojects.com.au/PM-Knowledge_Index.html

¹⁵ For some options on standard industry classifications see:

- USA: https://en.wikipedia.org/wiki/Standard_Industrial_Classification
- Australia: <http://www.abs.gov.au/ausstats/abs@.nsf/mf/1292.0>

¹⁶ Examples of 'purpose' can include:

- Internal (done by the organisation for itself) -v- external (done by the organisation for others, eg, 'the market')
- Client project (to acquire something) -v- contractor project (to deliver something)

¹⁷ For more on **differentiating normal, complex and megaprojects** see:

<https://mosaicprojects.wordpress.com/2017/06/09/differentiating-normal-complex-and-megaprojects/>

