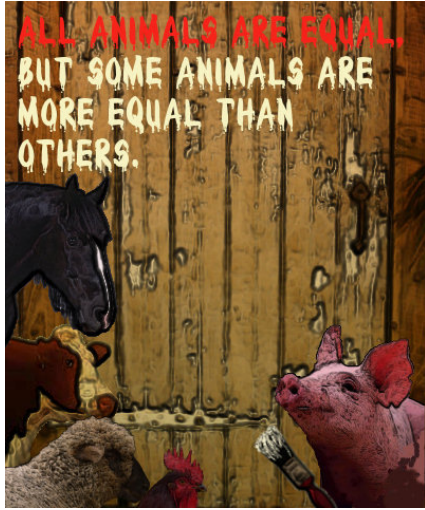# Project Size and Categorisation

"*All projects are equal but some are more equal than others*!" (or was that animals?[1])

In reality each project is uniquely different and therefore project management cannot be a one-size-fits-all process or discipline. The *PMBOK® Guide* makes this clear in Chapter 1.

The ability to efficiently manage new projects is directly affected by an organization's ability to remember past successes and learn from past challenges[2]. This requires a logical, organised categorisation process for both new projects and new programs[3].

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)[4] to reduce complexity.

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[1]   George Orwell: Animal Farm, 1945.

[2]   For more on **Lessons Learned** see: https://www.mosaicprojects.com.au/WhitePapers/WP1004_Lessons_Learned.pdf

[3]   For more on **program typology** see:
       https://www.mosaicprojects.com.au/WhitePapers/WP1022_Program_Typology.pdf

[4]   For more on **Stakeholder Management** see: https://mosaicprojects.com.au/PMKI-TPI-075.php

For more White Papers see: https://mosaicprojects.com.au/PMKI.php

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!*[5]

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 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 core[6]. 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 study[7].

Technical Difficulty (degree of <u>complication</u>)

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 produced[8]. 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

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[5] See: **Understanding Programs and Projects** - https://www.mosaicprojects.com.au/PDF_Papers/P078_Programs_Projects_Full_Paper.pdf and **Differentiating Programs from Projects**: https://www.mosaicprojects.com.au/WhitePapers/WP1002_Programs.pdf

[6] For more on **program typology** see: https://www.mosaicprojects.com.au/WhitePapers/WP1022_Program_Typology.pdf

[7] For more on **managing mega projects** see: https://www.sbs.ox.ac.uk/faculty-research/megaproject-management

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

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.

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 very different to the issues around *bleeding edge,* technically complicated projects discussed above. There is always a degree of uncertainty associated with every project, what matters is understanding the degree of uncertainty, ensuring most key stakeholders appreciate this and its consequences, and then choosing an appropriate project delivery strategy[9] to either minimise unnecessary uncertainty or that will embrace the uncertainty and seek to exploit the opportunities it offers (an 'agile' approach[10]).

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

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[9] For more see: **Project Strategy** - https://mosaicprojects.com.au/WhitePapers/WP1038_Strategy.pdf

[10] For more on **Agile** see: https://www.mosaicprojects.com.au/PDF_Papers/P109_Thoughts_on_Agile.pdf

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:

Painting by Numbers
Traditional project management works well when both 'what's to be done' and 'how to do it' are well understood by all key stakeholders including the client and the project team. Closed projects (panting by numbers) can be fully defined, estimated, planned, etc. There are low levels of uncertainty and ambiguity; risks are largely known and manageable. Value is largely achieved by delivering the requirements on time and on budget. A typical software project of this type would be installing an upgrade into an office where the same upgrade had been previously installed in several other locations. This type of project is ideally suited to traditional project management approaches defined in the *PMBOK® Guide*, PRINCE2, and/or 'Waterfall' approaches to managing project work.

Going on a Quest
In these projects, the objective is clear but the way to achieve the objective is uncertain. At the end of the day, success or failure is clear cut; the objective has been achieved (or not). The challenge is optimizing the way forward. Process and system improvement projects tend to fall into this category. The objective is to reduce processing time by 20% - this is easily measured on the completion of the project. The difficulty is determining the best way to achieve the objective. Some of the options include improving the user interface, simplifying the work flow, speeding up network traffic and processing times or a combination of two or more of the elements? Ambiguity is low - we know what's needed, uncertainty is high - we are not sure how to achieve it.

Before committing major resources to the main work of the project adequate time has to be allowed to prototype solutions and test options before a final design solution can be determined and then implemented. The project needs to be developed in phases with go/no go gateways as the design is firmed up. There are risks associated with any creative design process and most software projects are 'quests' requiring creative solutions to identified problems to achieve the desired objective. One way to achieve this is to set up a 'deep-dive hackathon where teams, or individuals, work in parallel to first define and then solve the problem with frequent review and consolidation breaks.

Making a Movie
In these projects the tools and techniques are well known but the final outcome is uncertain. Only after the project is complete can the results be measured and the success or failure of the project determined. Most culture change projects and marketing projects (and making movies) are in this category. The tools to be used including: training, communicating, advertising, etc are well known and the traditional (if not optimal) mix of techniques understood for most situations. What no one can predict is if the 'public' will acclaim the final result, merely accept the final result or dump the final result.

Traditional project management is not enough in these projects; there is a continual need to measure results, feedback information and adapt the mix of activities to optimize the likelihood of success. The key value measurement is attempting to answer the question is it worth spending more or should we cut and run? Efficient stakeholder communication and relationship management is crucial. Whilst there will be some outstanding successes (block busters) and some total flops most projects in this category finish somewhere in the middle. The art is spending just enough effort to achieve an acceptable outcome – dealing with shades of grey. One innovative approach that can be used in this type of project is the 'double diamond' developed by

the UK Design council. The approach is divided into four distinct phases – Discover, Define, Develop and Deliver – the Double Diamond is a simple visual map of the design process[11].
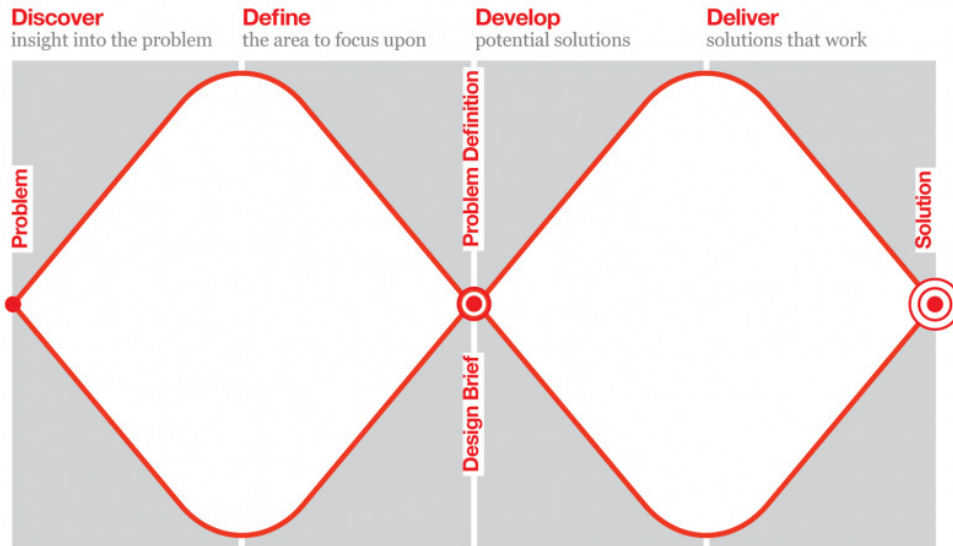
Lost in the Fog

I actually prefer Prof. Rodney Turner's version 'a walk in the fog'. This type project is a journey towards a desired new state, usually in response to a recently identified problem; for example, "we are losing market share and profits are down in xxx". We know the problem, potential solutions range from closing the business unit to re-pricing, to changing the offering or possibly increasing market presence.

No one is sure of the optimum outcome, or how best to achieve it. The only option is to proceed carefully, stop at regular intervals to check exactly where you are and re-plan the way forward. Exactly the way you navigate through a thick fog. Both ambiguity and uncertainty are high.

Project management is about making sure at each 'stop point' the value achieved to date is locked in and then refocus on the next increment. Agile software development is ideal for this type of project. Each iteration builds new capability and value and the learning provides a platform for the next iteration of development.

Management is both easy and difficult. It is easy because there is no point in setting fixed plans (you have no idea what to plan). It is difficult because decisions on value and whether to stop or continue are subjective and need to be made in a collaborative environment of trust.

Traditional measures of success such as on-time and on-budget are largely meaningless; typically there are no statistics to base this type of measure on. Consequently these projects are the realm of cost reimbursable contracts and partnerships; stakeholder relationship management, and a clear understanding of value are the only effective tools for building to a successful outcome. An 'agile' approach to management is essential[12].

Some final thoughts on uncertainty
1. Both the client/sponsor and the project team need an understanding of the type of project and agree to configure the project management processes appropriately. The more uncertainty and ambiguity,

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[11] For more on 'double diamond' see:
      https://www.designcouncil.org.uk/news-opinion/design-process-what-double-diamond

[12] For more on **Agile** see: https://www.mosaicprojects.com.au/PDF_Papers/P109_Thoughts_on_Agile.pdf

the more important the project's client is to achieving project success! If expectations are not aligned disaster awaits.

2. The skills required of a project manager change from largely technical if the project is 'painting by numbers' to almost completely relational to manage a 'walk in the fog'. Selecting the right person to lead the project and relate to the client and stakeholders is crucial.

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 defined[13]. 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 unclear[14].

Managing uncertainty is closely associated with and influences the complexity of the relationships discussed below. The key difference is much of the unnecessary uncertainty can be removed by effective stakeholder consultation and proper project planning – this is a sensible risk minimisation process. The challenges are identifying what parts of the uncertainty can be reduced and what parts of the uncertainty are intrinsic to the project; then determining a sensible level of investment to reduce the manageable elements of uncertainty. The residual uncertainty becomes a key consideration in the project's risk management processes. These are manageable and to a degree predictable processes. Complexity has a very different nature……

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. Complex systems involving people (eg, your stakeholder community), technology, or both, react in unpredictable ways to stresses and stimuli – dealing with emergent issues and opportunities needs an adaptive, agile approach supported by a resilient management system. Planning and preventative processes are still important, but cannot be relied on to eliminate unexpected outcomes from the complex system.

Complexity Theory[15] 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 large[16]. Effective stakeholder management[17] is

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13 For more see: **Projects aren't Projects**: https://mosaicprojects.wordpress.com/2009/04/09/projects-arent-projects2/

14 For more see: **Avoiding the Successful Failure** -
   https://www.mosaicprojects.com.au/PDF_Papers/P046_Successful_Failure.pdf

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

16 For further discussion see: **A Simple View of 'Complexity' in Project Management**:
   https://mosaicprojects.com.au/PDF_Papers/P070_A_Simple_View_of_Complexity.pdf

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

the key to obtaining the commitment needed to effectively deliver the project both form 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 project[18] 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 context[19] 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 classification[20] or application area;
- The stage in the product's lifecycle, R&D, Development, Implementation, Operations, Maintenance;
- The purpose of the project from the performing organisation's perspective[21];
- 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 projects[22];

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18 For more on **complex project management** see: https://iccpm.com/

19 Source: Series on *Categorizing Projects and Programs*, PM World Journal Vol. III. Alan Stretton.
20 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

21 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)

- 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

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22 For more on **differentiating normal, complex and megaprojects** see:
https://mosaicprojects.wordpress.com/2017/06/09/differentiating-normal-complex-and-megaprojects/