Kingston University London

A new approach to Project Management based on a combination of Predictive and Adaptive thinking

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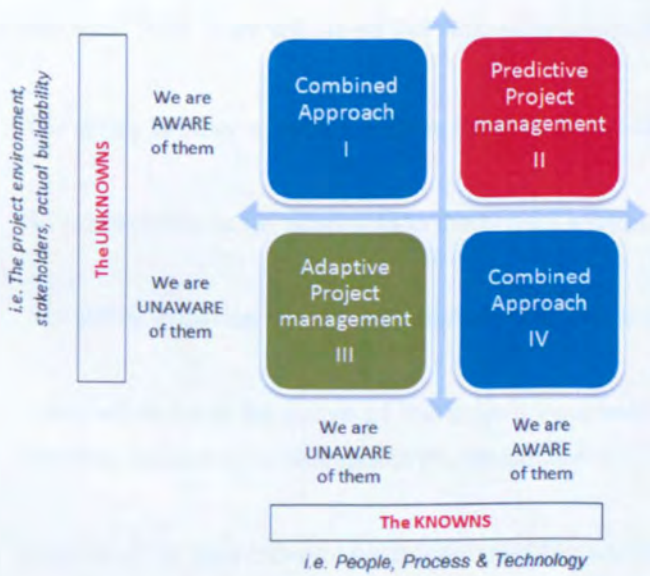
9 SELECTING & IMPLEMENTING THE RIGHT PROJECT MANAGEMENT APPROACH

9.1 Introduction

This chapter explains a framework that has been developed to select, customise, implement and maintain a project management process. This framework was presented to delegates of the IPMA 24th World Congress in Istanbul in November 2010 (Hanif & Limbachiya 2010).

In Chapter 1 we introduced the Rumsfeld quotation in a form of a two by two matrix. The idea behind this was to demonstrate the scope of the research described in this thesis. Quadrants I and IV are seen as projects requiring a combined approach of Predictive and Adaptive project management.



Examples of different projects and which quadrant they fall in

Project Type	Quadrant	Risk
Creating an underwater crossing between the UK and USA	I	High
Constructing a single storey house extension	II	Low
Creating a new database to track international criminals	III	Medium
Building a new airport terminal in the Middle East	IV	High

Figure 9-1 The Rumsfeld Matrix with example of project types

Figure 9-1 shows the matrix and also shows some example projects and how they relate to the individual quadrants of the Rumsfeld Matrix. In this Chapter we will introduce the SixP concept and explain the individual steps in further detail.

SixP is a framework that has been developed to satisfy the needs of most projects. It allows the project manager to select the best possible project management approach, customise it and maintain it through the project life cycle. Working in this manner ensures that project management processes are kept lean and that they do not become an unnecessary administration burden for the project team leading to further frustrations. The principles of AdPM thinking, like empowering individuals and soliciting regular feedback are assumed.

9.2 Why is SixP so different from other methods?

SixP is an approach that is predicated on the use of simplistic and common sense processes in order to deliver a project in the best possible manner. For a team to benefit from SixP they will need the following attributes:

- The ability to have a flexible attitude towards each individual in the team.
- An appreciation to be adaptable to the project environment.
- The ability to devise simple and practical solutions in order to perform work tasks.
- They will need to be aware of the project environment and ensure that their work is modified according to changes in the environment.
- They must be supportive of each team member and help them reach their full potential.

9.3 Understanding the Project Paradigm

Before SixP can be described it is important to understand that one needs to understand the importance of the Project Paradigm and how this affects the eventual development and maintenance of project processes.

The Oxford Dictionary defines a 'Paradigm' as follows:

"A typical example or pattern of something; a pattern or model"

We create intellectual frameworks (paradigms) embodying systems of ideas and beliefs. Paradigms shape the way practitioners, professionals and academics perceive the discipline and directly shape many of its tools and techniques, service offerings and certification programs (Smyth & Morris 2007).

Every project has its own unique paradigm. This paradigm develops over time and is in a continuous state of change, often reflecting changes in the project environment, positively or negatively.

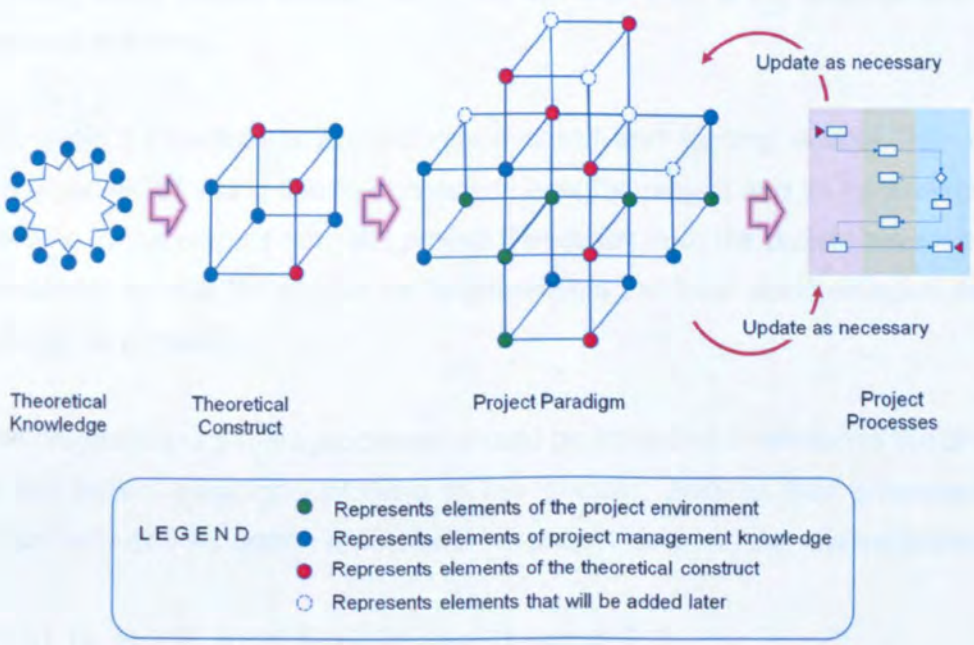


Figure 9-2 The Project Paradigm

Figure 9-2 shows the evolution of the project paradigm. There are four distinct stages by which the project paradigm and project processes are developed. We use our theoretical knowledge to help us shape and form our ideas. Theoretical knowledge in this instance relates to the Project Management Body of Knowledge. Our theoretical knowledge helps us understand how the various project management subjects interact with one another.

When a project manager is approached by a client, the project manager will create a theoretical construct based upon his or her discussions with the client. This

theoretical construct will be developed with the knowledge and experience of the project manager and ultimately include elements of the client's requirements.

This theoretical construct will assist the project manager in developing a 'model' of the project. Based on this theoretical construct the project manager will assemble a project team and develop some initial processes.

Once the project is launched then the theoretical construct will need to be modified as the project environment starts to exert both positive and negative effects on the project. Elements of the theoretical construct will need to be reshaped to take account of the project environment. This will lead then to the development of the project paradigm.

The project paradigm is a constantly evolving and forming activity. The project manager will be using this to understand how the project and its environment are reacting to the outputs from the project. Feedback from the project environment is necessary so that the project paradigm reflects the 'real' world situation as near enough as possible.

The project management processes should be amended in relation to the changes in the project paradigm. Working in this manner, ensures that processes stay meaningful and accurately reflect both the project view and the real world view

9.4 What is SixP and how does it work?

SixP contains six steps that ensure that the right project management approach is selected, customised, implemented and maintained throughout the project life cycle (figure 9-3).

In figure 9-3, read the diagram from the right hand side first and then move towards the left. It starts with the Deming Cycle stages of Plan, Do, Check and Act. The six stages of the SixP framework is then shown and how it relates to the Deming Cycle. Towards the far left of the diagram is a brief matrix indicating the roles and involvement of the various people that need to make SixP successful.

SixP is not a process but a framework for ensuring good project management practice is embedded into a project.

Appendix A1 shows a rich picture of how the SixP should be used.

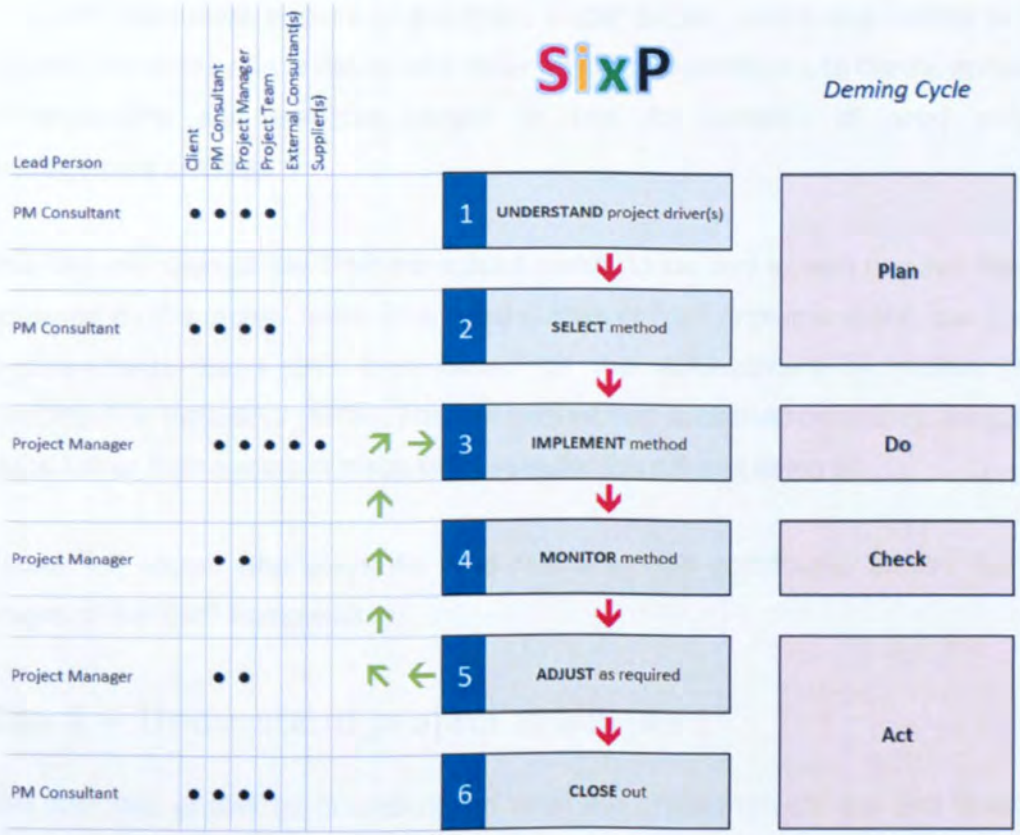


Figure 9-3 The SixP framework

To ensure impartiality and increase the effectiveness of this approach, it is recommended that SixP is implemented on a project with the help of an experienced project management consultant.

An external consultant is seen necessary and once appointed will be able to provide the following:

- To assist the project manager to drive the change in behavior required.
- To energise the project team so that extra ordinary performance can be achieved.
- To challenge old fashioned perceptions and the status quo.

- To re-invigorate the project team, if they have become complacent.

The SixP consultant will ensure that the proper formalities are completed and that the Client and project team fully understand the role that they have to play.

The SixP consultant is more of a subject matter expert, coach and mentor to the project. His or her role is not to take away any responsibility but to clarify, enhance understanding and energise people to see the benefits of good project management practice.

The remuneration of the SixP consultant needs to be tied in with positive results achieved by the project team. The initial stages of SixP implementation can be on a time-charge basis and then based on the achievement of project (Key Performance Indicators (KPIs). This will ensure that sustained measures are put in place rather than putting in place processes for the sake of doing so.

Figure 9-3 shows who plays the lead role and who contributes across the six stages of the SixP framework.

9.5 Step 1 – Understand project driver(s)

The first step of SixP is to understand what the project drivers are and how will they influence the project.

From our research, we have concluded that there are two main types of project environment that are faced by most projects, DUCE (Dynamic, Uncertain & Complex Environment) or KRUE (Known, Regular & Uniform Environment).

As we become more knowledgeable and aware of the project and its surrounding environment, we become more confident in terms of project delivery. A project may start out as a DUCE and then convert to a KRUE. The point at which this change takes place is known as the 'turning point'.

As there is a lot of uncertainty before the 'turning point', it is better both for the client and the external consultant, to be remunerated on a time-charge basis. After

the turning point, when the project scope is firmed up a fixed type remuneration can be agreed between both parties.

Regardless of size or complexity, all projects experience uncertainty which could be higher in the earlier stages and then gradually reduce to a much lower and manageable level, further down the project life cycle. Uncertainty can be due to a lack of clarity, detail, data or project scope. The exact point at which there is a shift from uncertainty to more certainty, is the TP (Turning Point). This is shown in figure 9-4. For example, before the TP a cost reimbursable type of contract could be utilised when engaging with contractors / consultants or Adaptive project management thinking could be utilised, in order to navigate through the uncertainty.

Figure 9-4 shows the DUCE and KRUE environments along with 'turning point' and how this affects which type of project management thinking is relevant.

The type of environment faced by the project determines which project management thinking is most appropriate for the project.

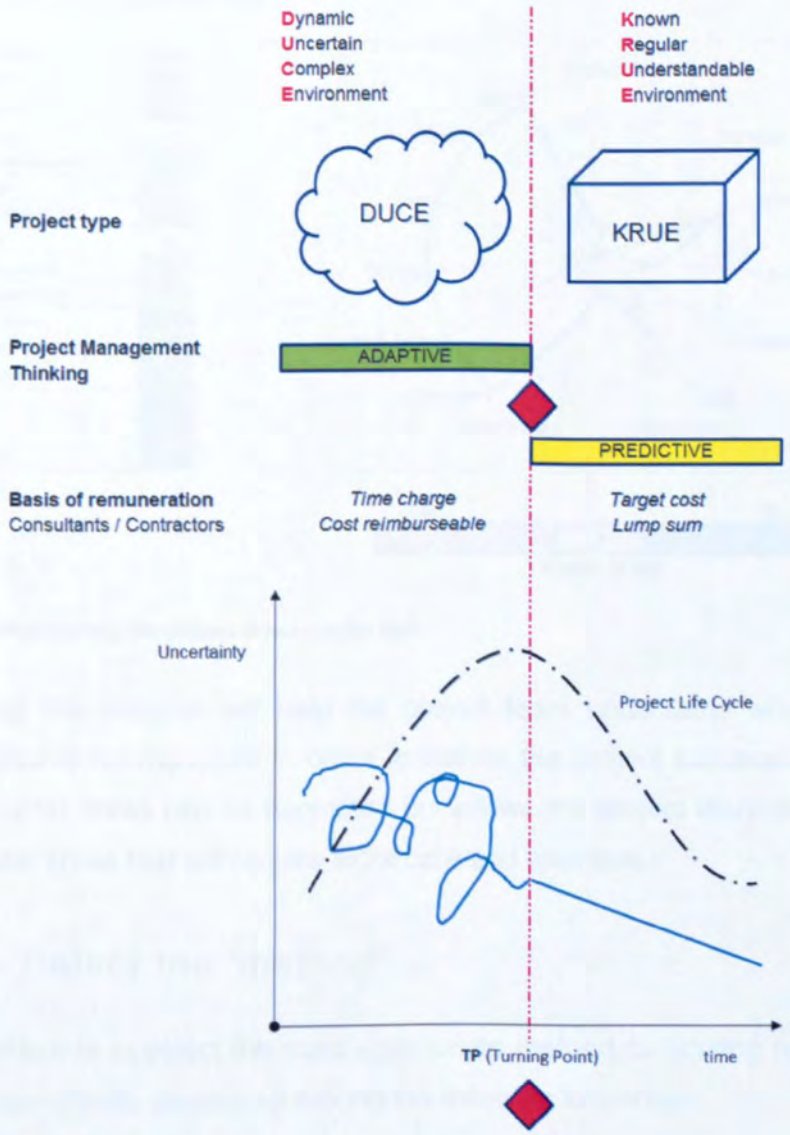


Figure 9-4 DUCE & KRUE types under SixP

Once the project environment is understood, the first step of the SixP framework is to complete the project drivers' matrix, as shown in figure 9-5.

The diagram in figure 9-5 is an example of a how such an analysis could be carried out for a project.

15 different project drivers are scored in terms of importance which helps in understanding where particular focus and attention will be required by the project team.

Understanding the project drivers

Project DRIVERS		Score
1	Product	1
2	Solution	1
3	Political	0
4	Environmental	4
5	Social	2
6	Technological	1
7	Legal	3
8	Economical	1
9	Stakeholders	2
10	End Users	5
11	Health & Safety	5
12	Quality	5
13	Cost	5
14	Plan	5
15	Scope	5

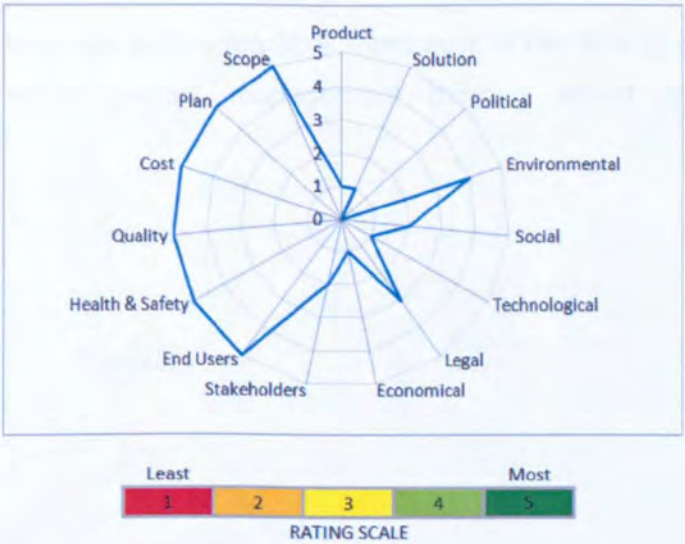


Figure 9-5 Understanding the project drivers under SixP

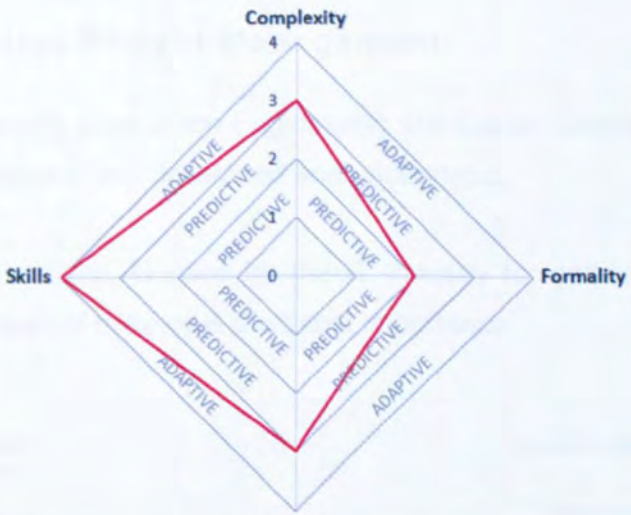
Undertaking this analysis will help the project team understand what particular aspects need to be managed in order to deliver the project successfully. It does not mean other areas can be neglected but allows the project team to appreciate the particular areas that will require extra care and attention.

9.6 Step 2 – Select the 'method'

The next stage is to select the most appropriate method by scoring responses to questions specifically developed around the following key areas:

- Velocity - how fast the project needs to be delivered or completed
- Formality - how formal the process and procedures need to be.
- Skills - what resources are available to the project.
- Complexity - how complex the project is.

Figure 9-6 shows the output, from this part of the SixP framework in the form of a spider diagram indicating which project management thinking would be appropriate.



Predictive	Best Practice	Methodology	Technique	Approach
PRINCE2		X		
BS6079	X			
PMI PMBoK	X			
Earned Value			X	
Critical Chain Project Management			X	

Adaptive	Best Practice	Methodology	Technique	Approach
SCRUM*		X		
Extreme Programming (XP)*		X		
Extreme Project Management (XPM)*		X		
Rapid Application Method (RAD)*		X		
Managing Successful Programmes (MSP)				X

* These methods are normally used for projects in the IT Industry

Figure 9-6 Output from the SixP framework

The matrix will indicate whether Predictive or Adaptive project management thinking would be appropriate and also provides a list of the different methods as an aid memoire.

9.7 Step 3 – Implement the 'method'

The particular methodology chosen could range from PRINCE2 (Predictive Project Management) to SCRUM (Adaptive Project Management). Whichever methodology is adopted, it must be carefully customised to the unique requirements of the project so that maximum benefit can be obtained from its use.

Predictive or Adaptive Project Management

PPM thinking is largely used in the Engineering and Construction industries and is used where the scope is well developed and understood.

AdPM on the other hand, is used by the IT industry for software development projects, where speed of delivery is of utmost importance.

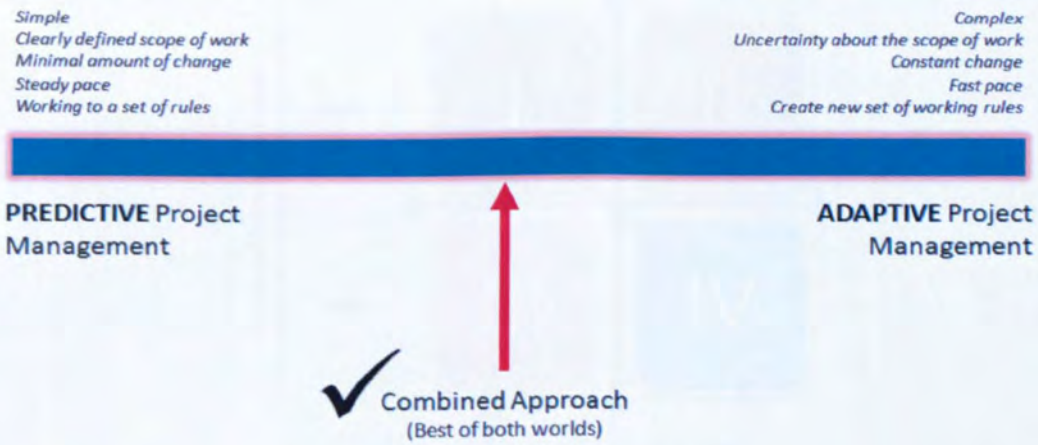


Figure 9-7 The combined approach to project management

Figure 9-7 shows the main characteristics of both thinking types and shows that there is great benefit from having a combined approach in order to have project management processes that are meaningful and assure successful delivery.

The role of the individual

Individuals form the most important element of the project team. Each and every single individual needs to be energised and focused on the tasks that need to be performed.

On a large project team consisting of many individuals it can seem like a daunting task to ensure that everyone is energised and focused. The seasoned project manager will be able to pick up signs through conversations with team members during the course of the daily interaction with them.

There is a relationship between the amount of process required and the emotional intelligence of a team member.

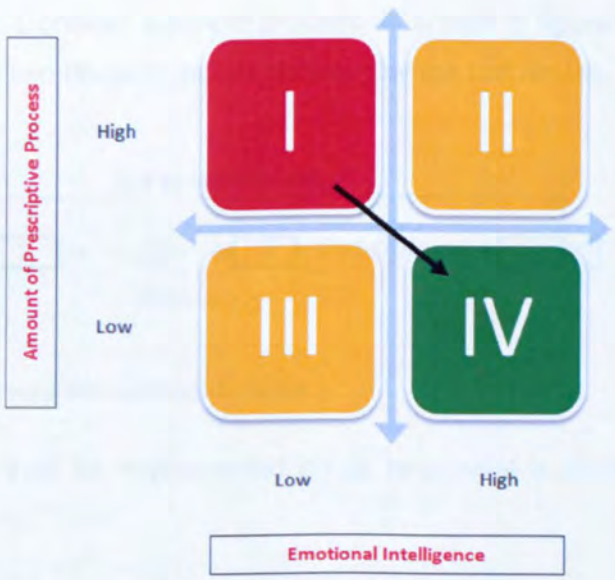


Figure 9-8 Emotional intelligence and Process compliance matrix

In figure 9-8, a matrix is shown with emotional intelligence on one axis and the requirement for process compliance on the other. Where individuals have low emotional intelligence they will have to be told what to do as they are not using their emotional intelligence to their full potential.

The project manager needs to focus on raising emotional intelligence awareness of the entire team so that the project is operating in Quadrant IV as depicted in

figure 9-8. By raising the emotional intelligence levels of project team members, less emphasis needs to be placed on 'telling people what to do' and the project manager can focus on important governance issues. This will ensure that processes are leaner and do not become an unnecessary administration burden for the project team.

Understanding process implementation

The following provides a good definition of what is a process:

"A process is a logical, related, sequential (connected) set of activities that takes an input from a supplier, adds value to it, and produces an output to a customer (Harrington, Esseling & VanNimwegan 1997) "

"a process is a set of linked activities that take an input and transform it to create an output (Johansson et a.l 1993)"

There are many ways processes can be customised in order to achieve the desired end result. Consider a simple process as shown in figure 9-9. It contains a 4-step activity with two decision points denoted by the red circles.

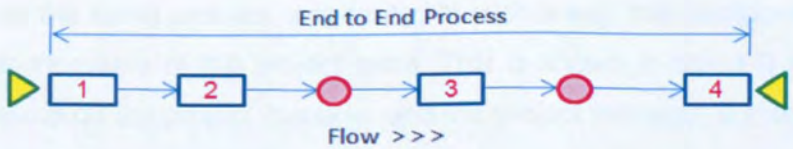


Figure 9-9 A four step process with two decision points

This process can then be implemented so as to provide a centralised model as shown in figure 9-10.

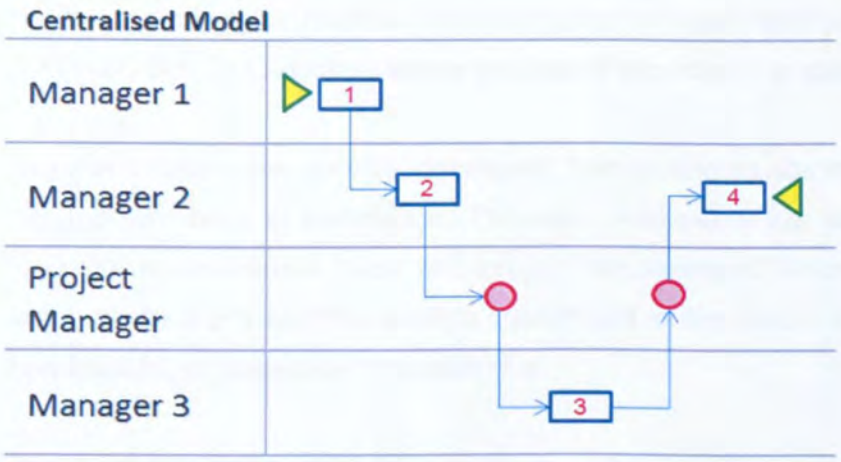


Figure 9-10 A centralised model for process flow

In the centralised model the project manager is involved in authorising the decisions. This is fine as long as the process is simple and that the flow of information is manageable. If the flow is quite high then it is likely to create a bottleneck as the entire process is held up until a decision is made by the project manager.

Another method of implementing a process is to use a decentralised model. In this model the same process is re-routed in such a way that decisions are delegated to other members of the project team. This is shown in figure 9-11. This takes the pressure off the project manager and the project manager is merely contributing to the overall process.

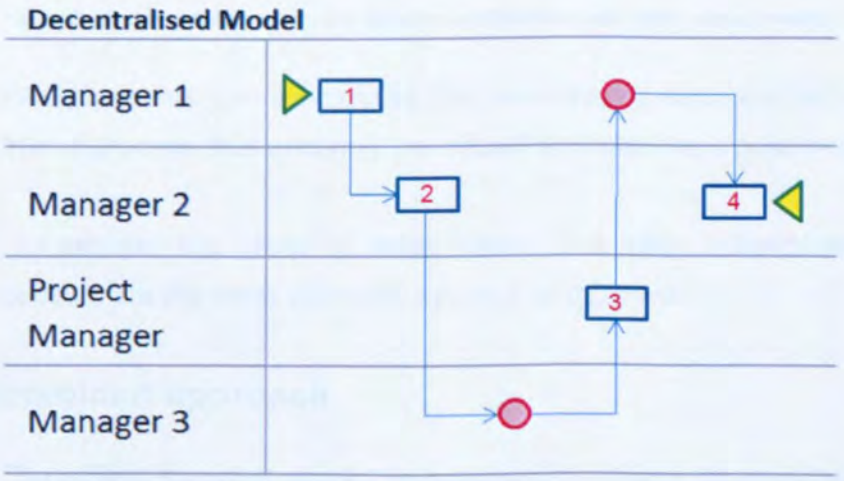


Figure 9-11 A decentralised model for process flow

Again responsibility is placed in the hands of other team members and this method is quite conducive to working where the flow of information is substantial.

In general processes can be developed from a known standard like a project management body of knowledge. The basic framework can be taken and then flexed to accommodate client and project requirements. Once this is done the result can be a process that is more customised to the needs of the project rather than following a process for the sake of it.

This is depicted in figure 9-12.

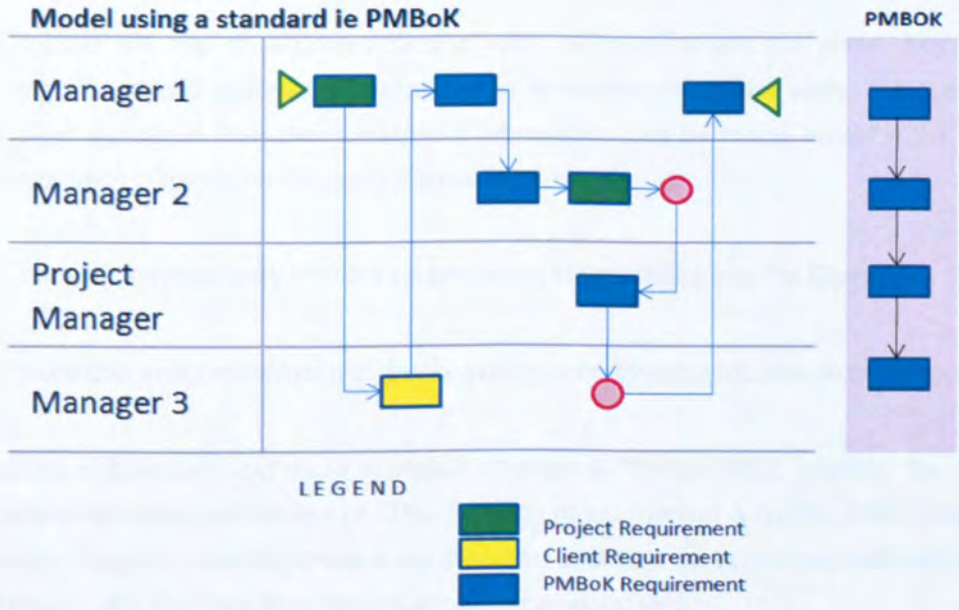


Figure 9-12 A model derived from a standard and blended with other requirements

Working in this manner ensures that unnecessary steps are not added or removed from a process thus ensuring that robust processes and good practice is followed.

No process sits alone (Buttrick 1997). The other considerations to take into account are the team structure, systems and culture.

The combined approach

The project manager should be continuously striving to simplify processes so that results are achieved in the most efficient and effective manner. Learning from the

PPM and AdPM methods can be applied in order to achieve greater project success. Some of the points to consider are as follows:

- Create an overall plan for the entire project based upon known facts
- Take sections of the plan and focus the attention of small teams to achieve the short term objectives
- Have regular team briefings to provide common information and obtain feedback
- Make use of dashboard type reports so that everyone can see the progress or lack of it
- Consider the use of a project control room. A room where the plans, key risks, performance and associated information is displayed all around walls. If the project budget permits it then the updating of information can be made easier if the initial information is displayed on plasma screens.
- Communicate frequently with the project team, stakeholders and the Client.
- Ensure that every individual member is making a positive contribution to the project.
- Using a Balanced scorecard approach (Kaplan & Norton 1996), monitor the entire project perimeter via the use of KPIs. Strategy maps (Kaplan & Norton 2004) could be utilised to ensure that the project and the wider business areas are also included in the creation of meaningful Key Performance Indicators (KPIs).
- Create a reward mechanism where positive behaviour is encouraged and the project team are aware of it.

In figures 9-13, a project is divided into manageable chunks of work. These are assessed individually to ascertain if a Predictive or Adaptive approach would be appropriate. These areas of work are monitored and once the deliverables are achieved a switch over to another type of thinking can be performed so as to provide the most appropriate means of planning and controlling work activities.

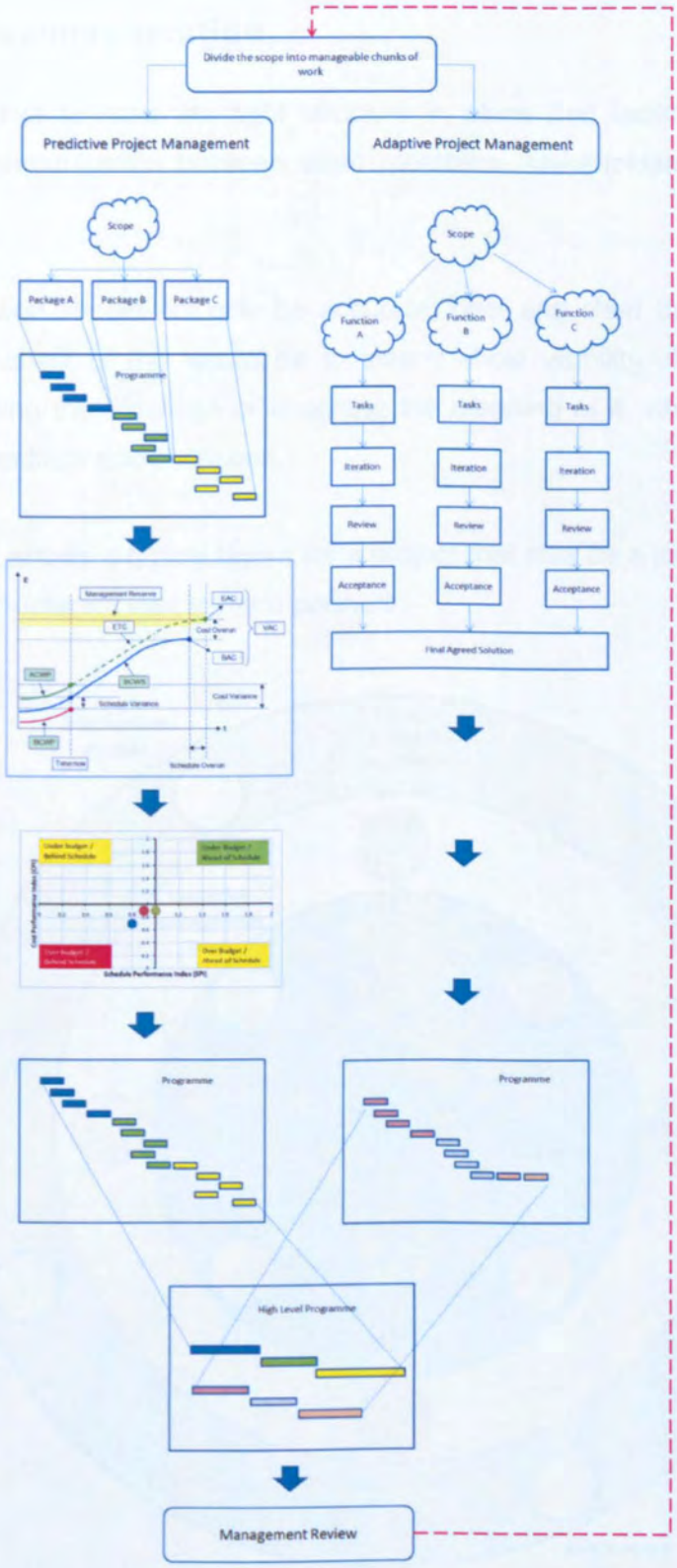


Figure 9-13 A combined PM approach using SixP

Clear lines of communication

It is imperative to have the right structure in place that facilitates efficient and effective communication between team members, stakeholders, end users and client.

Communication should not only be accurate, brief and clear but should be real-time. The benefit of this would be to clearly show visibility of project progress without tainting the message or distorting the meaning of it, which often leads to misunderstandings and confusion.

Figure 9-14, shows a typical layout for a project that may be a joint venture project consisting of different joint venture partners.

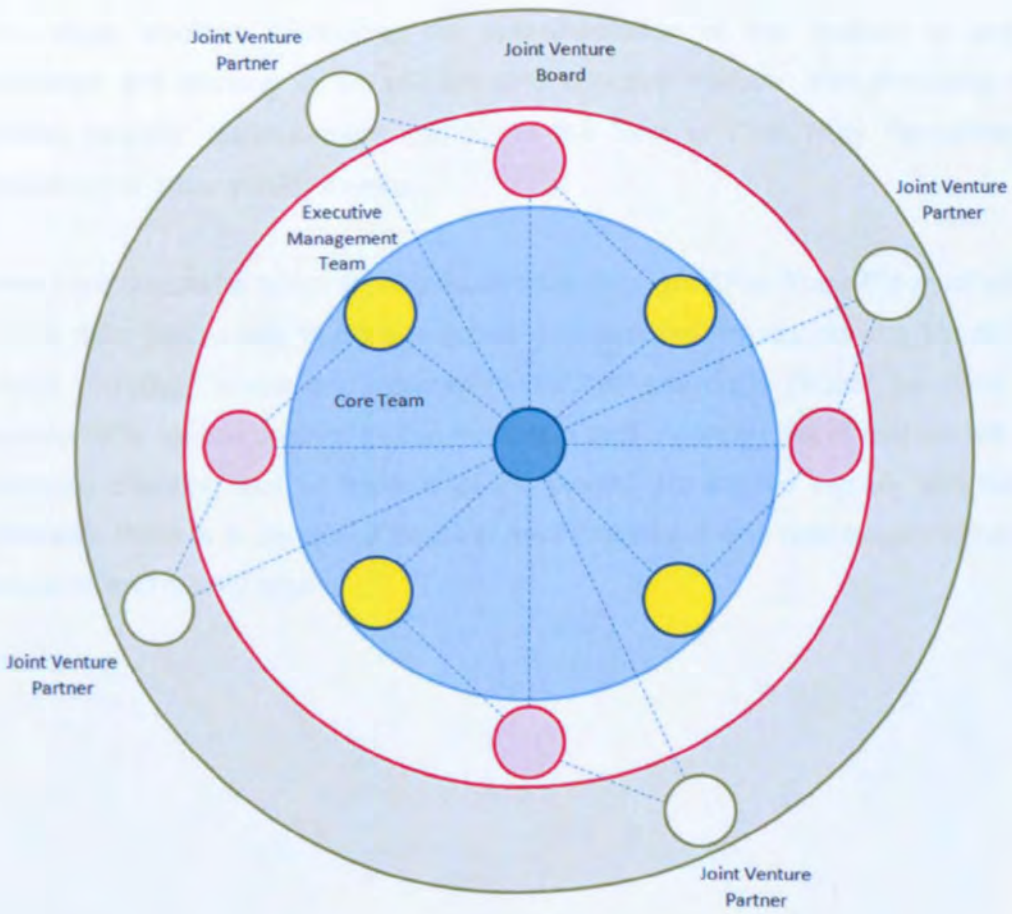


Figure 9-14 Communication between teams using SixP

The project manager of the core team is responsible for the accurate and timely dissemination of project information. This can be performed via online collaboration tools or via a central 'war room' type facility at the co-located project office.

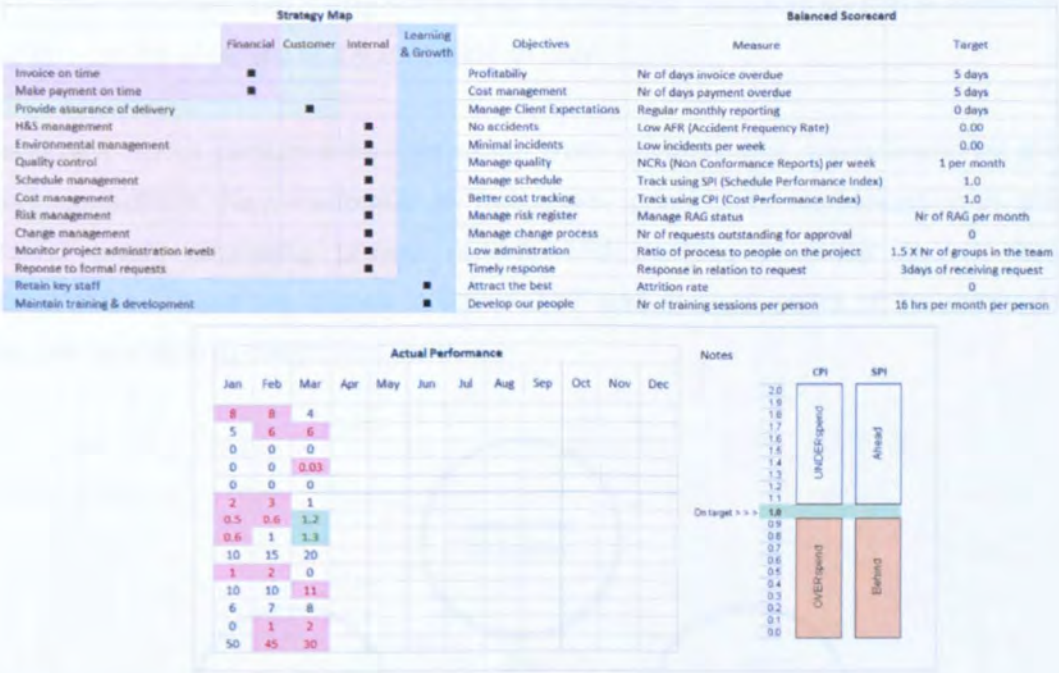
Real-time information can be made visible to all involved with the project via plasma screens. This is has the benefit of providing consistent information to a wide audience instantly and also makes updating information easier. It is also environmentally friendly as there isn't any wasted paper normally associated with updating with multiple versions.

Each party to the project must allow sufficient room for the relevant team members to continue with their tasks without any undue interference

9.8 Step 4 – Monitor the 'method'

This stage involves monitoring the implementation of the method to see if processes are working in an efficient and effective manner and producing the desired outputs. Measurement can be in the form of KPIs (Key Performance Indicators) or other similar metrics.

Great care should be taken in order to develop the right KPIs. The KPIs must allow for the right behaviours to be developed and nurtured throughout the life of the project. Strategy maps and balance scorecard approach should be used to develop KPIs for the project. In this manner a well-balanced set of metrics will be produced ensuring that all aspects of the project are treated equally and fairly. Otherwise there is a danger of causing an imbalance if one was to just focus on cost, time and quality issues.



Strategy Map

	Financial	Customer	Internal	Learning & Growth
Invoice on time	■			
Make payment on time	■			
Provide assurance of delivery		■		
H&S management			■	
Environmental management			■	
Quality control			■	
Schedule management			■	
Cost management			■	
Risk management			■	
Change management			■	
Monitor project adminstration levels			■	
Reponse to formal requests			■	
Retain key staff				■
Maintain training & development				■

Balanced Scorecard

Objectives	Measure	Target
Profitability	Nr of days invoice overdue	5 days
Cost management	Nr of days payment overdue	5 days
Manage Client Expectations	Regular monthly reporting	0 days
No accidents	Low AFR (Accident Frequency Rate)	0.00
Minimal incidents	Low incidents per week	0.00
Manage quality	NCRs (Non Conformance Reports) per week	1 per month
Manage schedule	Track using SPI (Schedule Performance Index)	1.0
Better cost tracking	Track using CPI (Cost Performance Index)	1.0
Manage risk register	Manage RAG status	Nr of RAG per month
Manage change process	Nr of requests outstanding for approval	0
Low adminstration	Ratio of process to people on the project	1.5 X Nr of groups in the team
Timely response	Response in relation to request	3days of receiving request
Attract the best	Attrition rate	0
Develop our people	Nr of training sessions per person	16 hrs per month per person

Actual Performance

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
8	8	4									
5	6	6									
0	0	0									
0	0	0.03									
0	0	0									
2	3	1									
0.5	0.6	1.2									
0.6	1	1.3									
10	15	20									
1	2	0									
10	10	11									
6	7	8									
0	1	2									
50	45	30									

Notes

Figure 9-15 Example of a KPI score sheet

Using the ideas developed by (Kaplan & Norton 2004) and (Kaplan & Norton 1996), figure 9-15 shows the strategy map approach, balanced scorecard and the subsequent KPIs which can be tracked during the life of the project.

In addition to this a typical dashboard report is shown in figure 9-16, which can be used to monitor project performance.

Figure 9-16 Example dashboard type report for monitoring performance

Obtaining feedback is crucial. It is equally important to ensure that the 'feedback' received is a true and accurate reflection of real time project progress. It is

therefore important that many sources of information are used so that a common pattern can be obtained of the real state of play.

Feedback about performance can range from an individual assessment by the SixP consultant, Key Performance Indicators, conducting workshops with the project team, analysing project reports and tracking progress against key deliverables. These are shown in figure 9-17 and are just some of the methods that are available to the project team.

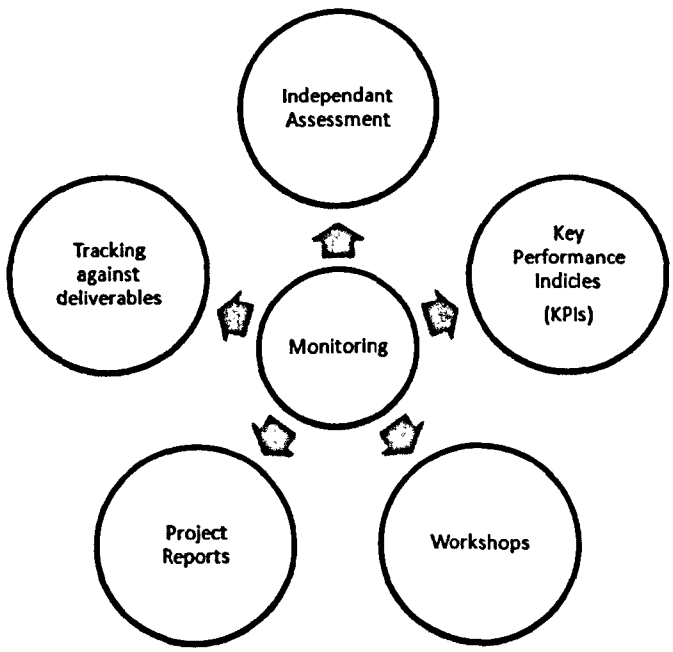


Figure 9-17 Monitoring SixP

9.9 Step 5 – Adjust as required

As project conditions change, modifications to existing processes will become necessary. Modifications could be in terms of 'additions' to processes or to 'prune' processes so that they remain lean and manageable. Frequent and regular inspections of the project processes by the SixP consultant will ensure that process efficiency is maintained through the life of the project.

9.10 Step 6 – Close out

At the end of the project, learning should be captured and recorded for future use and reference. In addition to this, a case study could be compiled and distributed

to the project community within the organisation. Lessons must be learnt and fed into other projects where appropriate.

This stage should be facilitated by the SixP consultant so that an objective assessment can be made of the real achievement and failure of the project team.

9.11 Practical application of the SixP concept

SixP can be used on any project regardless of size or complexity. The main objective of this method is to ensure that not only does the project team deliver the final product or result but strives towards achieving 'extra-ordinary' performance in doing so.

In order to implement it, it is imperative that this is undertaken by a person who has project management knowledge and experience in process and procedural development. Processes are seen as enablers and assist team members in defining their tasks and determining how project work will be undertaken. It is therefore important that these processes are lean so that non-productive time is eliminated or kept to a minimum.

SixP can be used where the Promoter or Client, feels that they would like the assurance that the project team will deliver the project in the best possible manner. This could range from a fast track office fit-out project to the implementation of a large scale infrastructure progamme. Where the scale of the task is huge then the services of the independent consultant should be utilised to ensure that the philosophy of the SixP concept is maintained.

SixP could also be offered as a professional service to Promoters and Clients by project management organisations. This could be used as part of the marketing strategy of such organisations in order to gain competitive advantage against firms involved in the provision of project management services.

9.12 Limitations

The SixP concept is based on common sense and not based on complex mathematics. As with any simple concept it is important that others are convinced

of its use and benefits. As more and more projects use this framework and they are successfully delivered, then this will promote its use.

High calibre individuals with healthy levels of emotional intelligence are required for this framework to be a success. This framework, like AdPM thinking principles, relies on common sense and less on forcing the individuals to follow a prescribed process.

9.13 Summary of Findings

SixP is not another methodology but a framework for ensuring that the right project management approach is identified, implemented and managed throughout the project life cycle. It is meant to be flexible so that it provides the project team a certain amount of freedom whilst providing the right level of governance for project managers and external parties. It enhances communication, promotes clarity and allows better buy-in from the project team. The main benefit of using this approach is that it allows lean and efficient procedures to be implemented thus improving the chances of project success.

The project management approach decided by the project manager must be suitable to achieve the following:

- It must be fit for purpose.
- It must allow for the project environment to be modelled and understood to a sufficient degree of accuracy.
- It must reflect and mirror the project environment.
- It must allow for sufficient management and control of project activities.
- It must be clearly visible and understood by all members of the project team.
- It must be adaptable and ready to be reshaped as and when the project environment changes.

The project team must appreciate that they will be required to work in different areas and to different tempos, all depending upon changes imposed by the project environment and as instructed by the project manager.

10 CONCLUSIONS AND IMPLICATIONS

10.1 Introduction

Regardless of project management ideology that is followed, project management consists of two main tasks - planning and controlling. The difference between Predictive and Adaptive project management thinking is the amount of time spent on planning.

In the ideal scenario, time spent on planning will ensure that problems further down the project life cycle can be understood and managed better.

If the project scope can be planned to a very high degree of certainty then any unknowns that appear further down the project life cycle can be accommodated accordingly. On the contrary, if the level of uncertainty is high then the best laid out plan may prove to be ineffective.

Regardless, good planning makes us see the consequences of our future actions. It helps us prepare for the unknown events that may or may not happen. It is for this reason that planning is a very important part of project management activity.

(Rodrigues & Bowers 1996) affirm that good project management should be able to cope with many of the adverse external influences and ensure a successful completion despite the environment.

10.2 The right calibre of people

Project management as a discipline needs to have a constant stream of good quality and high calibre people. This is important if the profession is to remain dynamic and be seen as an innovative one.

More people need to be encouraged to join the industry. A glance at the UCAS intake figures for this year suggests that student enrolment on engineering courses has increased by 5.70 % since last year.

This is shown in figure 10-1.

	2010	2011	Difference	%
Group T Non-European Langs and related	7,862	7,947	85	1.10%
Group J Technologies	11,159	10,648	-511	-4.60%
Z General, other combined & unknown	15,271	15,016	-255	-1.70%
Group R European Langs, Lit & related	24,835	24,685	-150	-0.60%
Group D Vet Sci,Ag & related	23,714	26,369	2,655	11.20%
Y Combined social sciences	31,792	31,410	-382	-1.20%
Y Combined sciences	34,718	36,151	1,433	4.10%
Group K Architecture,Build & Plan	44,465	44,608	143	0.30%
Group P Mass Comms and Documentation	53,935	57,583	3,648	6.80%
Y Social sciences combined with arts	61,818	60,134	-1,684	-2.70%
Y Combined arts	68,765	66,986	-1,779	-2.60%
Group Q Linguistics, Classics & related	71,884	69,021	-2,863	-4.00%
Group V Hist & Philosophical studies	81,759	80,959	-800	-1.00%
Group X Education	83,426	89,465	6,039	7.20%
Group F Physical Sciences	88,081	95,721	7,640	8.70%
Y Sciences combined with social sciences or arts	99,813	96,596	-3,217	-3.20%
Group A Medicine & Dentistry	93,928	97,233	3,305	3.50%
Group M Law	106,886	111,533	4,647	4.30%
Group H Engineering	116,894	123,507	6,613	5.70%
Group G Mathematical & Comp Sci	124,175	132,620	8,445	6.80%
Group C Biological Sciences	204,588	216,082	11,494	5.60%
Group L Social Studies	217,826	225,579	7,753	3.60%
Group W Creative Arts & Design	259,944	282,456	22,512	8.70%
Group N Business & Admin studies	270,394	289,144	18,750	6.90%
Group B Subjects allied to Medicine	292,093	336,668	44,575	15.30%
Totals	2,490,025	2,628,121		

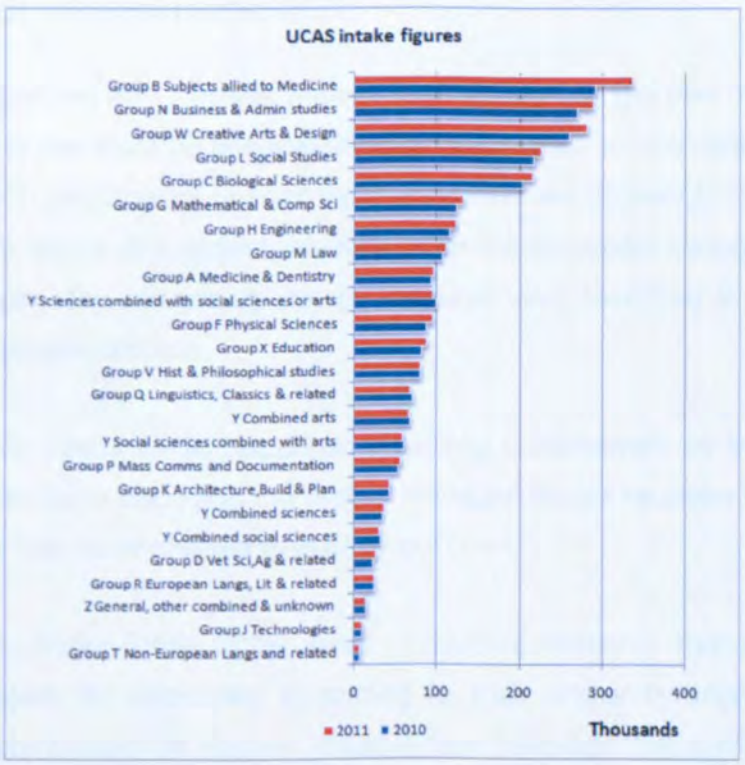


Figure 10-1 UCAS student intake figures for 2011

This is excellent news as there is a steady intake of new people joining the industry. What now needs to be done is to ensure that they are provided the appropriate training and skills so that they are prepared for the project management profession.

Professional bodies must provide the necessary professional training as well to supplement academic knowledge gained in Universities. In the current downturn graduates may be motivated to joining other industries resulting in a loss of good resources for the construction industry (CIOB 2009).

CMI produced their economic outlook for the future and it states that the UK in particular is going to face difficult times as it tries to come out of the recession. This will also have an effect on the job market (CMI 2010).

One of the many findings of the Future Forecast for 2011 by CMI suggests the following:

"Managers have grave concerns over their organisations' people capabilities – 43 % do not believe their organisation has the right people to fulfil business objectives in 2011 (CMI 2010)"

10.3 The role of improvisation

Project management also involves a lot of improvisation on the part of the project manager. He or she must be adept at understanding when to use certain methods when faced with challenging, unpredictable and unknown situations. This is where the success or failure of a project depends upon the emotional intelligence of the project manager. Not everything can be captured and described in terms of a project management process.

More emphasis needs to be placed on providing a framework so that effective governance can be in place and the project manager should be given the freedom to then decide how he or she wants to carry out tasks.

(Leybourne & Sadler-Smith 2006) have conducted research that proves that project managers do improvise. According to their research, improvisation is defined as a combination of intuition, creativity and bricolage that is driven by time pressure. On the other hand intuition is defined as a cognitive conclusion based on decision maker's previous experiences and emotional inputs.

10.4 Emotional Intelligence

Emotional intelligence plays a key part in shaping and forming a good leader. Project managers / team members need to have good levels of this in order to perform at their best.

Emotional intelligence can be defined as:

"The ability to monitor one's own and others' feeling and emotions, to discriminate among them, and to use this information to guide one's own thinking and actions(Salovey& Mayer 1990)"

Emotional intelligence improves over time and a lot depends on how one was brought up. As a child, did one have the right atmosphere at school to develop some of the key skills like teamwork and leadership.

Research was undertaken by (Van Herden et al. 2006) that was aimed at improving the self-confidence, motivation and responsibility of primary school children. Results indicated that life skills programme should be implemented in schools to improve their emotional intelligence.

For example, by being captain of the cricket team a person already has a sense of leadership and when they are in the work place they tend to fall back and use these skills.

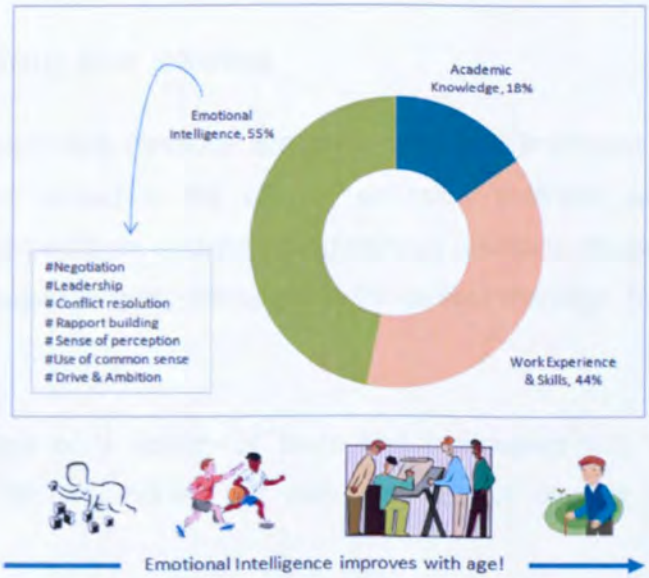
According to research undertaken by Gardner, he states that

"Intelligence is broader than the narrow cognitive domains measured by traditional intelligence tests and, in fact, contributes only about 20% to the factors that determine life success (Gardner 1995)"

In fact (Reiff et al. 2001) conducted research and demonstrated that there was very little difference in emotional intelligence levels between students with Learning Difficulties to those with out.

As human beings we are all born with abilities and some of us will not have used or even realised that we have these skills. They can lay dormant within us, until we are faced with a difficult situation and they surface. These skills can be learned over time.

As we get older and wiser our emotional intelligence gets better. In figure 10-2, we diagrammatically show that of a typical person, 10% can be attributable to say academic knowledge, 20% to work experience and 70% to emotional intelligence.



	Age	Duration
Born	0	22
Start school	5	
A levels	18	
University	22	
Start work	23	42
Retire	65	
Retirement	95	30

Figure 10-2 Emotional Intelligence

Emotional intelligence is a very important part of project management either as a project manager or team member. High levels of emotional intelligence guides us to make sense of situations cope better and make the right decisions. Project management can be a very stressful occupation and emotional intelligence can help in coping with the demands of this type of work.

(Clarke 2010) has also conducted research into emotional intelligence and team based working. The conclusion of such research was that greater participation in team-based learning creates stronger bonds in the team, once individuals are aware of their own personal emotional intelligence.

Team members with high levels of emotional intelligence are better able to work together as a team.

Projects can involve high levels of stress and politics. According to (Pinto 2000), politics and project management are two processes, which while very different, are also inextricably linked. No one can go far in project management without understanding how far politics will take them in their organisation.

10.5 Understanding the basics

All project management methods are good and it is important that the project manager is well versed in the use of as many methods as possible. The knowledge developed from understanding various methods coupled with personal experience of project delivery will prepare the project manager for the challenges of the future.

Having knowledge of a variety of tools and techniques will help the project manager in developing his or her own methods of dealing with challenging situations.

PPM methods are a good grounding for an individual who is new to project management. Once the basics are understood then the individual is mentally ready to work with AdPM methods.

10.6 Changing the mindset

When an individual is working on a project that is using PPM, the mindset is around completing the project with minimal changes to the project scope. There is a mechanism for dealing with changes but in the main, change is seen as an unnecessary inconvenience.

On the other hand individuals engaged on AdPM projects embrace change as this is seen as part of the challenge of project delivery.

Therefore depending upon which project management thinking is adopted, requires a certain mindset so that individuals can perform to the best of their abilities.

10.7 PPM or AdPM, which is better?

It is not a matter to choose between one type of thinking over the other.They are both useful and have been successfully used in the engineering & construction and IT industries respectively.

They both involve a common action of planning and then controlling according to the plan. In PPM the level of planning is taken to the nth degree in comparison to projects using AdPM thinking.

Planning enables us to be prepared for the different scenarios that we will encounter when we launch the project and head off towards the end destination. The plan is never 100% accurate; it is merely a guide, which will be corrected as the journey continues.

10.8 Building project management capability

Building a professional capability in project management knowledge can only be achieved through the mastery of the basics. The foundation stones of project management have been PERT, CPM, Gantt Charts and Earned Value. This is largely as a result of US Government and associated companies involvement in projects in the early 1950s.

Figure 10-3 shows a diagrammatic view of the building blocks of project management. Starting with the base, individuals should understand the basics i.e. PERT, CPM, Gantt Charts and Earned Value.

A project management body of knowledge describes how the other sub disciplines of project management interact together. It also provides access to other tools and techniques that are required to function professionally as a project manager.

Predictive and Adaptive project management thinking then lies above this. It is advisable that an individual wishing to excel in project management must build a suitable capability in both thinking types.

One could not start to work with say Adaptive project management methods without having an appreciation of the basics of Gantt charts, even though they may not be extensively used by that method.

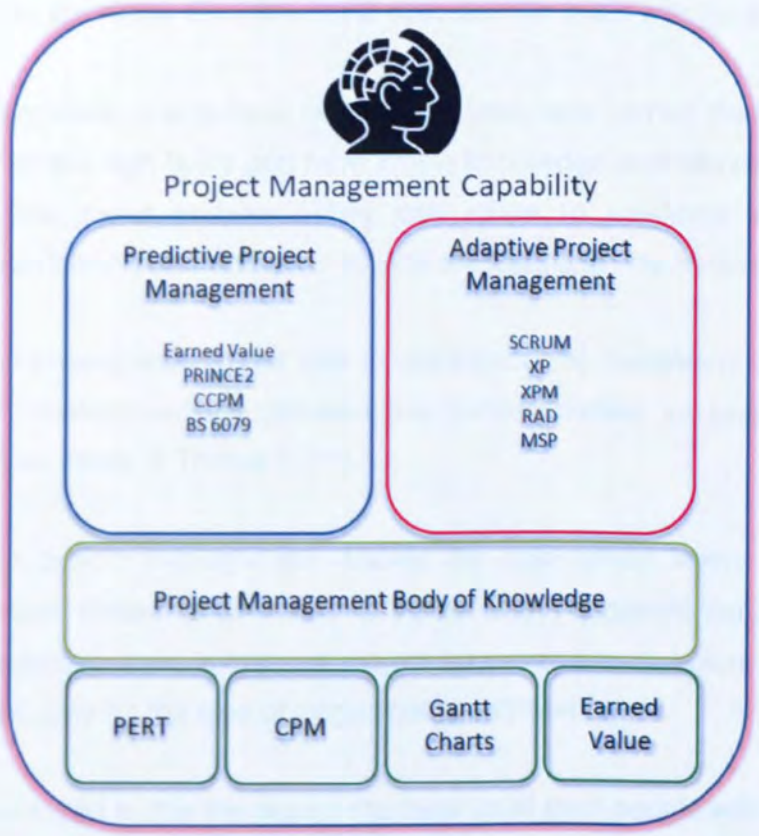


Figure 10-3 Building project management capability

Building a project management capability cannot be achieved until the individual also builds up healthy levels of emotional intelligence.

10.9 The project team of the future

In the projects of the future, project teams will have to be versatile. Relying on PPM or AdPM thinking alone is not sufficient.

The perfect project team is highly focused and consists of energised group of individuals. They work with relentless conviction to 'do the right thing'. They are trend-setters, they don't need to copy anybody or anyone but they themselves set new benchmarks.

(Katzenbach & Smith 1993) provide a good definition of what a team is:

"A small number of people with complementary skills who are committed to a common purpose, set of performance goals, and approach for which they hold themselves mutually accountable."

They are highly disciplined and execute their tasks with great skill and accuracy.

They know how to 'read between the lines' and correct their behavior accordingly. They are high flyers and have ample knowledge and can devise multiple solutions to the same problem. They can relate to everyone and more importantly understand the affects their actions are having on the external environment.

The project team will be able to understand the complexity of the environment and the interconnections between the various parties as proposed by (Antoniadis, Edum-Fotwe & Thorpe 2011).

The project manager will display the appropriate levels of leadership for the project. Research by (Muller & Turner 2007) suggests that the project manager's leadership style influences project success. It is therefore imperative to get the right style for the type of project being delivered.

In addition to this the project manager must treat people with respect at all times. It is in the environment of mutual trust and respect can real progress can be made (Peters & Waterman 2004).

10.10 Hypothesis

From the analysis carried out in Chapter 7, the table 10-1 shows the summary of results regarding hypothesis testing using the Chi square test.

Question			Chi Square test for independence
11	H_o	*Most organisation do NOT have a Programme Management Office*	✓
	H_1	Most organisations have a Programme Management Office	
13a	H_o	*Developing a high performance team is NOT important*	✓
	H_1	Developing a high performance team is important	
13b	H_o	*Having the right calibre staff is NOT important*	✓
	H_1	Having the right calibre staff is important	
13c	H_o	*Minimising changes to the project is NOT important*	✓
	H_1	Minimising changes to the project is important	
13d	H_o	*Managing the Client's expectation is NOT important*	✓
	H_1	Managing the Client's expectation is important	
13e	H_o	*It is NOT important to have the right balance between process and administration*	✓
	H_1	It is important to have the right balance between process and administration	
17	H_o	*Not all organisations undertake a PM maturity assessment*	✓
	H_1	All organisations do undetake a PM maturity assessment	
20a	H_o	*There is NOT too much emphasis on procedures that it becomes an administration burden*	✓
	H_1	There is too much emphasis on procedures that it becomes an administration burden	
20b	H_o	*Traditional project management methods ARE appropriate to todays projects*	
	H_1	Traditional project management methods are NOT appropriate to todays projects	✓
20c	H_o	*The volume of procedures is NOT driven by Client requirements*	
	H_1	The volume of procedures is driven by Client requirements	✓
20d	H_o	*The volume of procedures is NOT driven by internal company policy*	
	H_1	The volume of procedures is driven by internal company policy	✓
20e	H_o	*Project success can NOT be improved by more agile methods*	
	H_1	Project success CAN be improved by more agile methods	✓
20f	H_o	*Better calibre resources are NOT required for project success*	✓
	H_1	Better calibre resources are required for project success	
20g	H_o	*Project teams should NOT be given more freedom to do their tasks*	
	H_1	Project teams should be given more freedom to do their tasks	✓
21	H_o	*Respondents are satisfied with their organisation's PM procedures*	✓
	H_1	Respondents are NOT satisfied with their organisation's PM procedures	

Table 10-1 Summary of results

The hypothesis of this research was as follows:

"Extreme Project Management principles can reduce project bureaucracy when compared to traditional project management methods."

Belonging to the ADPM thinking, yes XPM can reduce the amount of paperwork when compared to PPM methods. There is more reliance on leadership and empowerment of people, which does take away the need for excessive volumes of process and procedures.

XPM is only used in the IT industry for software development projects. Its principles can be imported and used on construction projects. However, it will not entirely replace what is currently in use. The reason for this is that construction

projects sometimes contain activities that need to be planned to a certain level of detail because there may be a need to safeguard the health and safety for the occupants of say a facility. For this reason, we may need to have sufficient levels of paperwork to ensure that the proper governance is in place.

XPM principles can definitely be used as a catalyst for ensuring that the paperwork used on projects is streamlined and fit for purpose.

In the questionnaire survey carried out, 39% of respondents agreed that there was too much emphasis on project management processes to the extent that it becomes an unnecessary administration burden.

10.11 Area of Research

There is much to learn about how project management is being applied to other industries. Project environments are increasingly becoming complex and the project manager of the future will be coming up against many challenges and opportunities.

There should be cross fertilisation of ideas between IT and Construction industries as there is much to learn from project management experiences within these areas.

10.12 Practical Implications

The new pictogram developed as a result of the Keyword analysis can be used for teaching project management to students, project team members, clients, stakeholders and end users. It enhances understanding of what is required from an individual as a team member or project manager.

SixP is a framework that would be useful in implementing the right project management approach. It can help project teams to successfully achieve their objectives. It will ensure that everyone understands why they have to follow a certain path in order to deliver the project.

Enhancing one's understanding improves visibility. Improved visibility of project goals will in turn promote better buy-in from the Client, Project Manager, Project team members, stakeholders and end users.

Having a more focused project team that fully understands what work needs to be performed, will allow the project team to focus on the real issues. They will be empowered to think for themselves and make the appropriate decisions and be more effective as individuals.

Suggestions for embedding Predictive & Adaptive project management principles for projects

The following table summarises what measures can be put in place or developed by project managers to be more effective managers and responsive leaders.

Ref	Description of improvement	Suggestion(s)
1	Team Communication	Establish a war room for the project. Suggest the use of high impact visuals to highlight where you are and how far you have to go to achieve your objectives. If project budget permits then instead of paper make use of plasma screen technology. This will not only increase the impact of the presented information but also provide the ability to update the information faster.
2	Team progress	For larger project teams, break them down into smaller groups. Consider the use of daily briefings so that progress updates are easier and commitment is received from all participants. Weekly reports should be of dashboard type formats.

		Detailed monthly reports should be produced highlighting where management action is required.
3	Key Performance Indicators (KPIs)	Develop strategy maps for the project and then carefully construct KPIs based on a scorecard approach.
4	Feedback about project progress	Make sure that you have a good idea of what progress is actually being achieved. Triangulate performance informationutilising the following sources: • Project reports • Project team member feedback • Client feedback • Stakeholder feedback • End users feedback • Audit reports • Spot checks by 'walking the job' • Anonymous questionnaire surveys
5	Set the right tone for the project	Lead by example and engender the 'right' behavior appropriate for the project.
6	Project Processes	Continually ensure that processes are kept simple and 'prune' these regularly. Make sure that everyone is fully aware of its contents and has constant access to these. Provide training to all new starters as

		part of their induction to the project.
7	Reward good behaviour	Where there are examples of good work, this should be rewarded and recognised. Consider the use of a project newsletter so that the good news is communicated to all concerned.
8	Establish an effective governance framework for the project	Create a framework by which individuals are empowered to take initiative whilst complying with company procedures.
9	Programme of works	Manage the project programme in three distinct time frames. Past: Take note of actual time and cost expended of completed activities Present: Understand the key challenges impeding the progress of the team. Look at the sequencing of activities. Check the logic to see if the manner in which activities are sequenced are still practical. Future: Look at the horizon and anticipate what emerging issues are likely to prevent progress.
10	Delegate key functions to trusted and capable people	Spend more time in monitoring the project team, coaching, mentoring and providing guidance. Allow the team to take on responsibility and ensure that they use their own initiative at all times.
11	Induction of all project personnel	The project manager should take time to sketch out a detailed induction pack for the project team. As a minimum, this should contain the following:

		• The project background • The role of the team • The role of the sub teams • The projectorganisation chart • The project directory • The key objectives • Key Performance Indicators(s) • Targets for the project, teams and individuals • Type of behavior required on the project • Reward mechanism for teams and individuals • Governance rules • General housekeeping

10.13 Recommendations for Future Research

Project management must learn from its past in order to deal with the challenges of the future, it must remain as flexible as possible. It has been demonstrated that projects do not exist in a vacuum but that they exist to provide a business outcome, be it profit or social benefits.

There should be a move away from thinking that if the project team blindly follow a prescribed process then the project is and will be delivered successfully. All projects are subject to uncertainty and unpredictability and the project team must be focused on the project environment and adjust its behavior to counter the adverse effects from the project environment. This is the only way to anticipate problems before they crystallise into risks. In the author's opinion, more research needs to be done in the following areas:

Greater engagement between Academia & Industry

Theory and practice complement each other. It is important that Academia and Industry practitioners have a forum whereby they can exchange views and ideas. A UK Government initiative held between 2004 and 2006 was an example of how exchange of ideas has lead to further research and development in the field of project management (Winter, Cooke-Davies & Cicmil 2006)

More forums for exchange of ideas between the two worlds, i.e. Academia and Practitioners, is required so that it allows new ideas to be floated, tested and implemented. This is imperative if as a profession project management is to make advancements and keep up with the changes that are happening around us.

Creation of benchmarking clubs

Whilst there are many standardised reports into project performance, these have to be viewed with caution. Reports like the Standish CHAOS reports provide very generalised views and it would be advantageous to have more accurate project related information.

For commercial propriety reasons not all details can be obtained or discussed but these could be provided to an intermediary entrusted with the information who would then provide the output in a form that would be meaningful yet hide the commercial details.

An example of this would be to create a Benchmarking Club in Kingston University whereby organisations that regularly undertake projects are encouraged to become members of. All members would be required to provide project-related information to the University.

Project performance league tables could be produced whilst hiding the true identity of the organisation to which the project belongs to. In this manner both successful projects and those that have not been successful can be monitored and discussed openly.

Case study of a project using Adaptive Project Management

It would be beneficial to have a case study of a project that has used AdPM thinking, even if it is an IT project. It would be good to see how the project coped with the stresses and strains in the real world and what measures were undertaken by the project team to overcome them.

Real-time project reporting using IT and RFID

One way of reducing or even eliminating executive meddling on projects is to provide them with frequent, meaningful reports so that they are fully informed of the true status of the project (Kerzner 1995).

There is a need to produce more meaningful and timely project information and the use of Radio Frequency Identification methods could help in ensuring that on larger projects this information is made available in the most efficient manner.

(Majrouhi & Limbachiya 2010) provide an approach on how RFID technology can be used to improve communication within construction teams.

Regardless of the size of the project, good communication is extremely important. In the future, communication is likely to play and even more crucial part in project teams (Campbell 2007).

Focused education around leadership & soft skills

There has to be more emphasis on soft skills in university degree programmes. This could include not just the introduction to the theory but also involve role playing so that students are made aware of these necessary life skills.

Mentoring and Coaching of professionals

Project management can be a very stressful occupation. No matter how good the individual, stress will eventually catch up. It is important to have a good mentor or coach that one could talk to and obtain advice on tackling challenging situations.

A professional mentoring and coaching programme should be established that could be made available to project managers and project personnel. This role could be performed by an independent intermediary. It will provide an indication of the current problems and challenges being faced by practitioners and the trends that emerge could be used to develop future educational programmes.

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12 APPENDICES

APPENDIX A1 – SIXP RICH PICTURE

Selecting the right project management approach using SixP

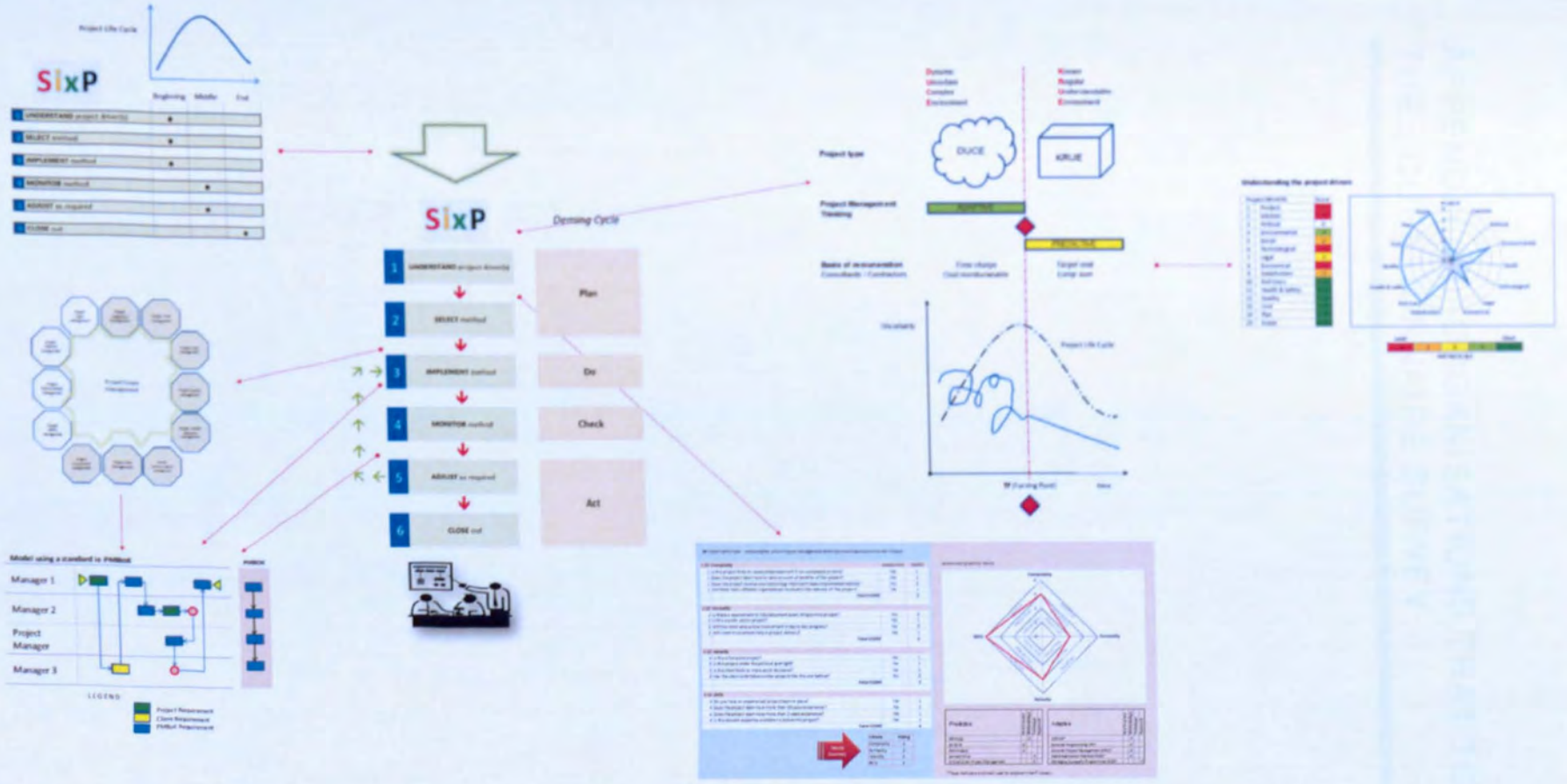

Figure 12-1 - SixP Rich Picture

APPENDIX A2 –ORGANISATIONS THAT TOOK PART IN THE : QUESTIONNAIRE SURVEY

The author would like to thank the following organizations that took part in the questionnaire survey:

- AMAP
- Tfl (Transport for London)
- BAA (British Airports Authority)
- Turner & Townsend
- London South Bank University
- Unite Group Plc
- Cabinet Office
- Mace
- Laing O'Rourke Scotland Ltd
- PRP Architects
- Middlesex Engineering Consultants Ltd
- Interserve Project Services Limited
- Highways Agency
- MorganEst
- EC Harris
- Carillion Plc
- ISG
- FerrovialAgroman
- Greco Consulting Services Ltd
- Schal
- Kingston University
- Wisewolf Consulting
- Lend Lease Projects
- Nespak
- Elevate East Lancashire
- QinetiQ
- McCarthy & Associates
- Educo UK
- KPMG
- The Nichols Group
- Hunter & Partners Limited
- ATKINS (METRONET)
- GVA second London Wall
- North East Wales Inst. of H.E.

- CLA Urban Development
- Mott McDonald
- GeoMechanics Inc.
- Tweed Consultants
- Jacobs UK Tower Bridge
- Doosan Babcock
- Bnconsult ltd

APPENDIX A3 – QUESTIONNAIRE SURVEY FORM

QuestForm

Preview Survey | Edit Survey Options | Edit Thank You Page | Finish Editing

Edit Survey Questions

Insert Question Here

Background & Introduction

Your are being invited to take part in a survey to support my PhD research in the field of project management.

I am interested in developing a decision making tool that will allow project teams to manage their projects without creating an unnecessary administration burden.

This survey contains 22 questions and should take no more than 15 minutes to complete.

Edit | Delete | Branch | Move

I would appreciate if you could complete this questionnaire by 29th February 2008.

For your kind support in this survey, all respondents will be emailed the annonymous results of this survey after the end date.

You can start the survey by clicking on the 'continue' button below.

Thank you,

Insert Question Here | Insert Page Break

Tahir

Tahir Hanif [illegible]

Email: K0643465@kingston.ac.uk

Edit | Delete | Branch | Move

Insert Question Here — PAGE BREAK — Remove Page Break

Part 1 - Information about You

Edit | Delete | Branch | Move

Insert Question Here | Insert Page Break

Edit | Delete | Branch | Move

Insert Question Here — PAGE BREAK — Remove Page Break

1.0 Please provide your name* Required

Edit | Delete

Branch Move

Insert Question Here Insert Page Break

2.0 Please provide the name of your organisation* Required

Edit Delete Branch Move

Insert Question Here Insert Page Break

3.0 Please provide your email address. (This will be used to send you the results of this questionnaire)

Edit Delete Branch Move

Insert Question Here — PAGE BREAK — Remove Page Break

4.0 Please indicate the approximate number of employees in your organisation

(Please select one option only)

- Less than 50
- Between 50 and 100
- Between 100 and 500
- Between 500 and 1,000
- Greater than 1,000

Edit Delete Branch Move

Insert Question Here — PAGE BREAK — Remove Page Break

5.0 Please indicate the approximate turnover of your organisation

(Please select one option only)

- Less than £50,000
- Between £50,000 and £100,000
- Between £100,000 and £500,000
- Between £500,000 and £1,000,000
- Greater than £1,000,000

Edit Delete Branch Move

Insert Question Here — PAGE BREAK — Remove Page Break

6.0 Which classification best describes your organisation?

(Please select one option only)

- Client
- Project Manager
- Architect
- Engineering Consultant
- Management Consultant
- Contractor
- Other

Edit Delete Branch Move

Insert Question Here Insert Page Break

If you selected 'Other' please provide further details

Edit Delete Branch Move

Insert Question Here — PAGE BREAK — Remove Page Break

7.0 What type of work are you normally involved in ?

(Please more than one option if necessary)

- Project management services
- Construction - New Build
- Construction - refurbishment / fit-out
- Facilities Management
- Other

Edit Delete Branch Move

Insert Question Here Insert Page Break

If you selected 'Other' please provide further details

Edit Delete Branch Move

Insert Question Here — PAGE BREAK — Remove Page Break

8.0 To which professional institutes do you personally belong to:

(Select more than one option if necessary)

- APM, Association for Project Management
- RICS, Royal Institution of Chartered Surveyors
- CIOB, Chartered Institute Of Building
- PMI, Project Management Institute
- RIBA, Royal Institution of British Architects
- ICE, Institute of Civil Engineers
- Other

Edit Delete Branch Move

Insert Question Here Insert Page Break

If you selected 'Other' please provide further details

Edit Delete Branch Move

Insert Question Here — PAGE BREAK — Remove Page Break

Part 2 - About your work

Edit Delete Branch Move

Insert Question Here Insert Page Break

Edit Delete Branch Move

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9.0 What project management software does your firm use?

(Please select more than one option where necessary)

- Microsoft Project
- Primavera
- Power Project
- Other

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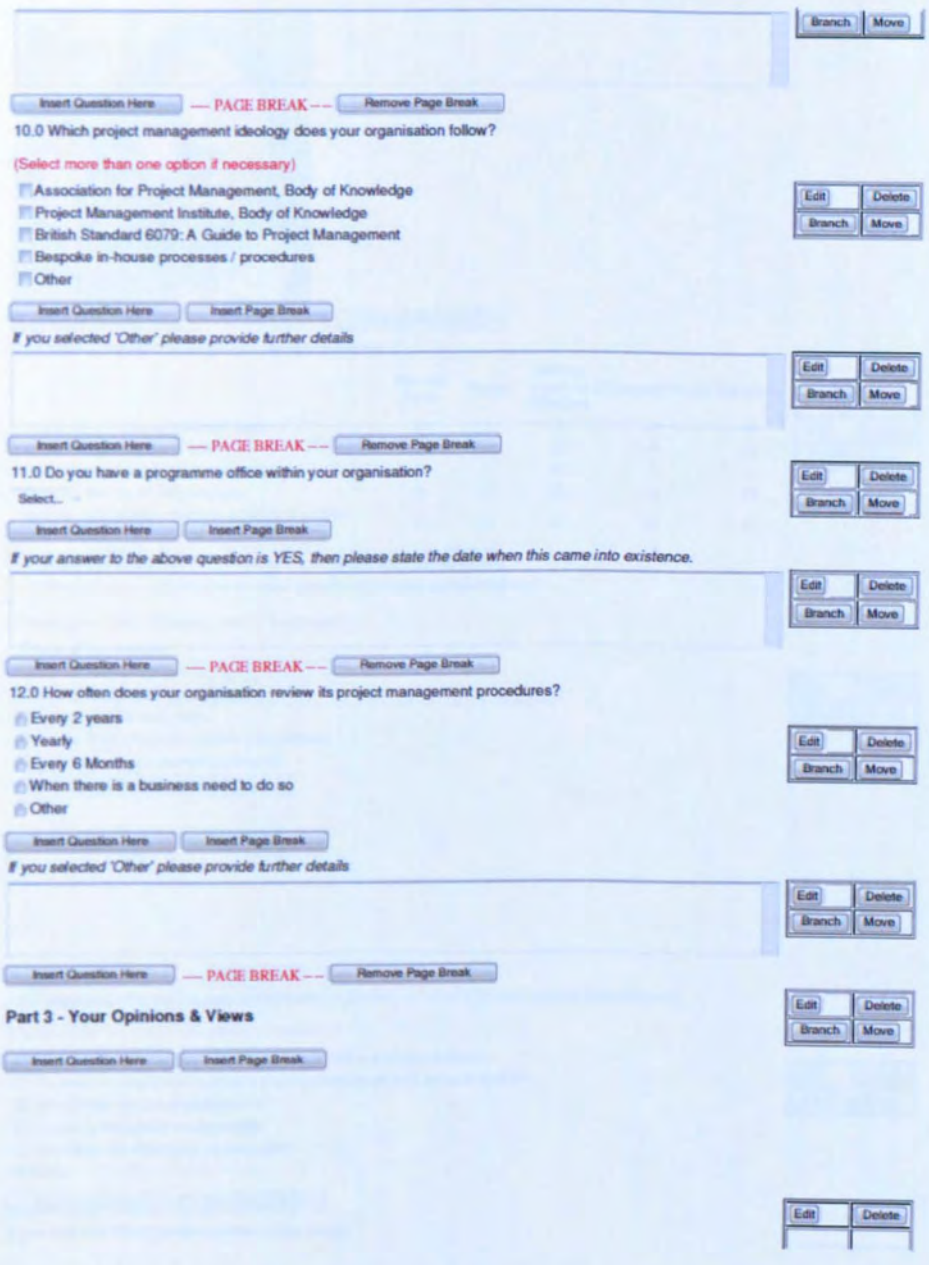
If you selected 'Other' please provide further details

Edit Delete



Branch Move

Insert Question Here — PAGE BREAK — Remove Page Break

13.0 What is important when you are managing projects ?

	Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
Developing a 'high performance' team					
Having the right calibre of staff					
Minimising changes to the project scope					
Managing the client's expectations					
Have the right balance between process & project administration					

Edit Delete Branch Move

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14.0 What do you consider to be the most common symptoms of project failure?

(Please select more than one option if necessary)

- Lack of sponsorship
- Lack of front end planning
- Lack of stakeholder engagement
- Incomplete business case
- Too much emphasis on following procedures
- Rigid project management processes
- Not having the right resources
- Other

Edit Delete Branch Move

Insert Question Here Insert Page Break

If you selected 'Other' please provide further details

Edit Delete Branch Move

Insert Question Here — PAGE BREAK — Remove Page Break

15.0 In general, what are the main reasons why organisations follow a project management process?

(Please select more than one option, if necessary)

- To ensure that everyone performs work activities in a similar manner
- The need to comply with internal company procedures and general controls
- To minimise risk to the organisation
- To comply with client requirements
- To comply with third party requirements
- Other

Edit Delete Branch Move

Insert Question Here Insert Page Break

If you selected 'Other' please provide further details

Edit Delete Branch Move

Insert Question Here — PAGE BREAK — Remove Page Break

16.0 In terms of your organisation, how were your project management processes and procedures orginally developed?

(Please select more than one option, if necessary)

- Following in-house research and development work
- Out of client requirements
- Based on known methodologies ie PRINCE2, PMI etc
- Other

Insert Question Here Insert Page Break

If you selected 'Other' please provide further details

Edit Delete Branch Move

Insert Question Here — PAGE BREAK — Remove Page Break

17.0 Have you undertaken a project management maturity assessment of your organisation?

Select...

Edit Delete Branch Move

Insert Question Here Insert Page Break

If you selected 'YES' please provide further details.

a)What model did you use? (OPM3, P3M3 etc)

b)What score did your organisation achieve?

Edit Delete Branch Move

Insert Question Here — PAGE BREAK — Remove Page Break

18.0 Which of the following project management ideology / methods are you familiar with?

(Please more than one option, if necessary)

- PRINCE2
- Managing Successful Programmes (MSP)
- Project Management Institute, Body of Knowledge
- Association for Project Management, Body of Knowledge
- British Standard 6079: A Guide to Project Management
- Critical Chain Project Management
- 'eXtreme Project Management'
- Theory of Constraints
- Earned Value

Edit Delete Branch Move

Insert Question Here — PAGE BREAK — Remove Page Break

19.0 How often do you use the following:

	Always	Regulary	Often	Sometimes	Never
a) PRINCE2					
b) Managing Successful Programmes (MSP)					
c) Project Management Institute, Body of Knowledge					
d) Association for Project Management, Body of Knowledge					
e) British Standard 6079, A Guide to Project Management					

Edit Delete Branch Move

f) Critical Chain Project Management					
g)'eXtreme Project Management'					
h) Theory of Constraints					

Insert Question Here — PAGE BREAK — Remove Page Break

20.0 Please read each of the following statements and provide your answers :

	Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
a) There is too much emphasis on project management processes to the extent that it becomes an unecessary adminstration burden					
b) Traditional project management methods are no longer appropriate for today's projects					
c) The volume of procedures on projects is driven by client requirements					
d)The volume of procedures on projects is driven by internal company policy					
e) Project success can be improved by the use of more agile solutions rather than relying on traditional project management methods					
f) Better calibre of project resource is required to ensure that projects are delivered successfully					
e) Project teams should be given more freedom to devise their own project management processes rather than forcing them to comply with standard procedures					

Edit Delete Branch Move

Insert Question Here — PAGE BREAK — Remove Page Break

21.0 How satisfied are you with your organisation's project management procedures ?

(A score of 1 being LEAST satisfied and 10 being MOST satisfied)

	1	2	3	4	5	6	7	8	9	10
Your organisation's project management procedures										

Edit Delete Branch Move

Insert Question Here — PAGE BREAK — Remove Page Break

22.0 Generally speaking, if you would like to see an improvement in project management processes and procedures, what would these be?

Edit Delete Branch Move

Insert Question Here Insert Page Break

APPENDIX A4 – EMERGING THEMES AND SUMMARY OF SURVEY RESULTS

Nr	Question Aim	Cronbach's Alpha	Response Summary	Processes developed in-house	Programme office	Processes only reviewed when the business need arises	The right calibre staff	Minimise change to project scope	Managing the client expectations	Having the right balance between process and project administration	Lack of front end planning - project failure	Process limits risk exposure for the organisation	PM Maturity	Earned Value	APM BoK	Traditional project management still relevant to todays projects	Agile PM solutions
1	Name																
2	Organisation																
3	Department details																
4	Employees		*59% of respondents work for an organisation that employs more than 1,000 employees.*														
5	Turnover		*86% of respondents indicate that their organisation has a turnover of more than 1,000,000 per annum.*														
6	Organisation classification		*31% of respondents indicate that their organisation is mainly involved in projects as 'project manager'.*														
7	Type of work undertaken		*33% of responses received indicate that the respondents undertook project management services as part of their regular service offering.*														
8	Professional institutes		*18% of the total responses received, relate to membership of the UK's Association for Project Management (APM).*														
9	Use of project management software		*47% of responses are recorded against the use of Microsoft Project.*														
10	Project management ideology followed		*51% of responses recorded against the use of in-house processed /procedures for their project management needs.*	●													
11	Do you have a programme office?		*30% of respondents indicate that they have a programme office within their organisation.*		●												
12	How often does your organisation review its project management procedures?		*60% of respondents indicate that they only review their process and procedures when there is a business need to do so.*			●											

Nr	Question Aim	Cronbach's Alpha	Response Summary	Processes developed in-house	Programme office	Processes only reviewed when the business need arises	The right calibre staff	Minimise change to project scope	Managing the client expectations	Having the right balance between process and project administration	Lack of front end planning - project failure	Process limits risk exposure for the organisation	PM Maturity	Earned Value	APM BoK	Traditional project management still relevant to todays projects	Agile PM solutions
13	5 statements relating to project management issues	0.326 ×															
	Developing a high performance team		*58% Disagree*														
	Having the right calibre of staff		*58% Disagree*				●										
	Minimising changes to the project scope		*53% Agree*					●									
	Managing the client's expectations		*93% Agree*						●								
	Having the righ balance between process & project administration		*79% Agree*							●							
14	What do you consider to be the common symptoms of project failure ?		*21% of responses are recorded against the 'lack of front end planning'. Respondents see this as the major cause of project failure.*								●						
15	What are the main reasons why organisations follow a project management process ?		*30% of responses are recorded against 'to minimize risk to the organisation'.*									●					
16	How were your project management procedures developed ?		*47% of responses are recorded against 'following in-house research and development work' category.*	●													
17	Have you undertaken a project management maturity assessment of your organisation ?		*Only 6% of respondents indicate that they have undertaken a project management maturity assessment of their capabilities.*										●				
18	Which project management ideology / methods are you familiar with ?		*18% of responses were recorded against the use of Earned Value in comparison to Critical Chain Project management (6%), Theory of Constraints (4%) and eXtreme Project Management (1%).*											●			
19	Preferences regarding 8 most common methods / project management thinking	0.777 ✓	*Aggregate total of (41%) of respondents actually apply APM Body of Knowledge thinking to their projects.*												●		

Nr	Question Aim	Cronbach's Alpha	Response Summary	Processes developed in-house	Programme office	Processes only reviewed when the business need arises	The right calibre staff	Minimise change to project scope	Managing the client expectations	Having the right balance between process and project administration	Lack of front end planning - project failure	Process limits risk exposure for the organisation	PM Maturity	Earned Value	APM BoK	Traditional project management still relevant to todays projects	Agile PM solutions
20	7 statements relating to project management issues	0.589 *															
	There is too much emphasis on project management processes to the extent that it becomes an unnecessary administration burden		*39% Agree*							●							
	Traditional project management methods are no longer appropriate for today's projects		*44% Disagree*														
	The volume of procedures on projects is driven by client requirements		*49 % Agree*													●	
	The volume of procedures on projects is driven by internal company policy		*68% Agree*	●													
	Project success can be improved by the use of more agile solutions rather than relying on traditional project management methods		*80% Agree*														●
	Better calibre of project resource is required to ensure that projects are delivered successfully		*85% Agree*				●										
	Project teams should be given more freedom to devise their own project management processes rather than forcing them to comply with standard procedures		*47% Agree*														●
21	How satisfied are you with your organisations project management procedures?																
	Rating (1) Least Satisfied		*0%*														
	Rating (2)		*0%*														
	Rating (3)		*8%*														
	Rating (4)		*3%*														
	Rating (5)		*17%*														
	Rating (6)		*19%*														
	Rating (7)		*22%*														
	Rating (8)		*17%*														
	Rating (9)		*8%*														
	Rating (10) Most Satisfied		*6%*														
22	Improvements they would like to see		*Basic and flexible processes*														

APPENDIX A5 – STATISTICAL ANALYSIS (QUESTIONNAIRE SURVEY)

Question 13	
Strongly Disagree	1
Disagree	2
Neither Agree or Disagree	3
Agree	4
Strongly Agree	5

Respondent ID	Developing a high performance team	Having the right calibre of staff	Minimising changes to the project scope	Managing the clients expectations	Have the right balance between process & project administration	SUM score	MEAN individual	STANDARD DEVIATION individual	z score	t score
34823	5	5	3	4	4	21	4.2	0.837	-8.450	-34.503
34841	5	5	5	5	5	25	5	0.000	-8.049	-30.486
34842	4	4	4	5	4	21	4.2	0.447	-8.450	-34.503
34843	5	5	3	5	3	21	4.2	1.095	-8.450	-34.503
34846	5	4	3	4	4	20	4	0.707	-8.551	-35.507
34849	5	5	3	5	5	23	4.6	0.894	-8.249	-32.496
34851	5	5	4	5	5	24	4.8	0.447	-8.149	-31.490
34852	5	5	2	5	5	22	4.4	1.342	-8.350	-33.499
34855	5	5	3	4	3	20	4	1.000	-8.551	-35.507
34860	5	5	1	4	3	18	3.6	1.673	-8.752	-37.515
34861	5	5	4	5	5	24	4.8	0.447	-8.149	-31.490
34868	3	4	2	4	4	17	3.4	0.894	-8.852	-38.519
34869	3	4	4	3	4	18	3.6	0.548	-8.752	-37.515
34870	5	5	3	4	4	21	4.2	0.837	-8.450	-34.503
34875	4	4	4	4	4	20	4	0.000	-8.551	-35.507
34881	5	5	5	5	5	25	5	0.000	-8.049	-30.486
34887	5	5	3	5	4	22	4.4	0.894	-8.350	-33.499
34899	5	5	3	4	4	21	4.2	0.837	-8.450	-34.503
35016	4	5	3	5	5	22	4.4	0.894	-8.350	-33.499
35020	5	5	4	4	4	22	4.4	0.548	-8.350	-33.499
35062	5	5	3	5	5	23	4.6	0.894	-8.249	-32.496
35067	5	5	4	5	4	23	4.6	0.548	-8.249	-32.496
35146	4	5	1	4	3	17	3.4	1.517	-8.852	-38.519
35147	4	4	4	5	3	20	4	0.707	-8.551	-35.507
35156	4	4	3	4	3	18	3.6	0.548	-8.752	-37.515
35182	4	4	4	4	4	20	4	0.000	-8.551	-35.507
35190	3	5	5	5	4	22	4.4	0.894	-8.350	-33.499
35212	5	4	4	5	5	23	4.6	0.548	-8.249	-32.496
35327	5	4	1	5	3	18	3.6	1.673	-8.752	-37.515
35329	5	4	3	3	4	19	3.8	0.837	-8.651	-36.511
35663	5	5	3	5	5	23	4.6	0.894	-8.249	-32.496
35710	5	4	4	5	3	21	4.2	0.837	-8.450	-34.503
35711	4	5	5	4	5	23	4.6	0.548	-8.249	-32.496
35813	3	5	5	4	4	21	4.2	0.837	-8.450	-34.503
35862	5	5	4	5	5	24	4.8	0.447	-8.149	-31.490
36165	3	4	3	5	4	19	3.8	0.837	-8.651	-36.511
36186	5	4	3	5	5	22	4.4	0.894	-8.350	-33.499
36207	5	4	4	5	5	23	4.6	0.548	-8.249	-32.496
36606	4	4	3	5	3	19	3.8	0.837	-8.651	-36.511
36722	4	4	3	5	3	19	3.8	0.837	-8.651	-36.511
37546	4	4	4	4	4	20	4	0.000	-8.551	-35.507
37575	4	5	5	4	4	22	4.4	0.548	-8.350	-33.499
38062	5	5	3	5	3	21	4.2	1.095	-8.450	-34.503
38066	5	5	4	4	4	22	4.4	0.548	-8.350	-33.499
38106	5	4	4	4	4	21	4.2	0.447	-8.450	-34.503
38118	5	5	1	5	3	19	3.8	1.789	-8.651	-36.511
38125	4	4	4	4	4	20	4	0.000	-8.551	-35.507
38135	5	5	4	5	4	23	4.6	0.548	-8.249	-32.496
38140	5	5	4	4	5	23	4.6	0.548	-8.249	-32.496
38203	5	5	4	5	5	24	4.8	0.447	-8.149	-31.490
38219	5	4	4	5	4	22	4.4	0.548	-8.350	-33.499
38229	4	5	4	5	4	22	4.4	0.548	-8.350	-33.499
38237	4	4	4	4	4	20	4	0.000	-8.551	-35.507
38271	4	4	4	4	4	20	4	0.000	-8.551	-35.507
38280	3	3	4	5	5	20	4	1.000	-8.551	-35.507
38283	3	5	3	5	4	20	4	1.000	-8.551	-35.507
38299	4	5	3	5	5	22	4.4	0.894	-8.350	-33.499
38410	5	5	3	5	5	23	4.6	0.894	-8.249	-32.496
38449	5	5	4	5	4	23	4.6	0.548	-8.249	-32.496
38650	5	4	2	3	4	18	3.6	1.140	-8.752	-37.515
38651	4	4	3	3	4	18	3.6	0.548	-8.752	-37.515
38653	5	4	1	4	4	18	3.6	1.517	-8.752	-37.515
38691	4	5	4	5	3	21	4.2	0.837	-8.450	-34.503
38741	3	5	4	5	3	20	4	1.000	-8.551	-35.507

Item MEAN	4.453	4.563	3.422	4.516	4.078
Item STANDARD DEVIATION	0.711	0.531	1.006	0.617	0.719
Item VARIATION	0.506	0.282	1.010	0.381	0.518
SUM Item VARIATION	2.696				
TEST Mean	21.031				
TEST STANDARD DEVIATION	1.992				
TEST VARIATION	3.967				
K (# items)	64				
K-1	63				

Cronbach's Alpha	0.33	> 0.9 - Excellent, > 0.8 - Good, > 0.7 - Acceptable, > 0.6 - Questionable, > 0.5 - Poor, and <0.5 - Unacceptable

Standard error of measurement	=(Std.Dev. Of Test)(Sq. Root of 1-Cronbach's alpha)
Standard error of measurement	1.636
95% C.I. for 1st person (upper limit)	7.406
95% C. I. for 1st person (lower)	0.994
95% C.I. for 10th person (upper limit)	6.806
95% C. I. for 10th person (lower)	0.394
95% C.I. for 20th person (upper limit)	7.606
95% C. I. for 20th person (lower)	1.194

12.1

Question 19 How often do you use the following

No Data	0
Sometimes	1
Often	2
Never	3
Regularly	4
Always	5

Respondent ID	P2	MSP	PMBoK	APM BoK	BS6079	CCPM	XPM	TOC	SUM score	MEAN individual	STANDARD DEVIATION individual	z score	t score
Respondent 1	3	1	3	1	3	3	3	3	20	2.5	0.926	-1.455	35.451
Respondent 2	1	1	3	1	3	3	3	3	18	2.25	1.035	-1.483	35.166
Respondent 3	0	2	0	0	4	0	0	0	6	0.75	1.488	-1.654	33.456
Respondent 4	3	3	3	3	3	3	3	3	24	3	0.000	-1.398	36.021
Respondent 5	4	0	0	0	0	0	0	0	4	0.5	1.414	-1.683	33.171
Respondent 6	4	1	2	2	2	0	0	0	11	1.375	1.408	-1.583	34.169
Respondent 7	4	0	0	0	0	0	0	0	4	0.5	1.414	-1.683	33.171
Respondent 8	4	3	1	3	3	3	3	3	23	2.875	0.835	-1.412	35.878
Respondent 9	4	4	3	3	3	3	3	3	26	3.25	0.463	-1.369	36.306
Respondent 10	4	0	0	0	0	0	0	0	4	0.5	1.414	-1.683	33.171
Respondent 11	4	3	3	3	3	3	3	3	25	3.125	0.354	-1.384	36.163
Respondent 12	4	1	3	4	5	3	3	3	26	3.25	1.165	-1.369	36.306
Respondent 13	4	0	0	0	0	0	0	0	4	0.5	1.414	-1.683	33.171
Respondent 14	4	3	3	5	5	3	3	3	29	3.625	0.916	-1.327	36.733
Respondent 15	4	3	3	3	1	3	3	3	23	2.875	0.835	-1.412	35.878
Respondent 16	4	3	2	5	4	1	0	1	20	2.5	1.773	-1.455	35.451
Respondent 17	4	3	3	3	1	3	3	3	23	2.875	0.835	-1.412	35.878
Respondent 18	4	4	1	4	2	3	3	1	22	2.75	1.282	-1.426	35.736
Respondent 19	4	3	3	3	3	3	3	3	25	3.125	0.354	-1.384	36.163
Respondent 20	4	4	0	0	4	0	0	0	12	1.5	2.070	-1.569	34.311
Respondent 21	4	3	1	2	1	3	3	3	20	2.5	1.069	-1.455	35.451
Respondent 22	4	3	3	1	3	3	3	3	23	2.875	0.835	-1.412	35.878
Respondent 23	4	0	0	1	1	0	0	0	6	0.75	1.389	-1.654	33.456
Respondent 24	4	3	3	3	3	3	3	3	25	3.125	0.354	-1.384	36.163
Respondent 25	4	3	3	1	1	0	0	0	12	1.5	1.604	-1.569	34.311
Respondent 26	4	5	0	0	0	0	0	0	9	1.125	2.100	-1.612	33.884
Respondent 27	4	0	2	2	0	0	0	0	8	1	1.512	-1.626	33.741
Respondent 28	4	3	3	1	3	3	3	3	23	2.875	0.835	-1.412	35.878
Respondent 29	4	3	0	2	3	3	3	3	21	2.625	1.188	-1.441	35.593
Respondent 30	4	0	0	0	0	0	0	0	4	0.5	1.414	-1.683	33.171
Respondent 31	4	0	0	0	0	0	0	0	4	0.5	1.414	-1.683	33.171
Respondent 32	4	1	1	2	2	3	3	3	19	2.375	1.061	-1.469	35.308
Respondent 33	4	3	2	3	3	3	3	3	24	3	0.535	-1.398	36.021
Respondent 34	4	0	2	0	0	1	0	1	8	1	1.414	-1.626	33.741
Respondent 35	4	3	2	3	3	3	3	1	22	2.75	0.886	-1.426	35.736
Respondent 36	4	0	0	0	0	0	0	0	4	0.5	1.414	-1.683	33.171
Respondent 37	4	4	2	4	1	1	1	1	18	2.25	1.488	-1.483	35.166
Respondent 38	4	3	3	1	3	3	3	3	23	2.875	0.835	-1.412	35.878
Respondent 39	4	0	0	0	0	2	1	0	7	0.875	1.458	-1.640	33.599
Respondent 40	4	0	0	0	0	5	2	0	11	1.375	2.066	-1.583	34.169
Respondent 41	4	3	1	2	3	3	3	3	22	2.75	0.886	-1.426	35.736
Respondent 42	4	0	4	0	0	0	0	0	8	1	1.852	-1.626	33.741
Respondent 43	4	0	0	1	0	0	0	0	5	0.625	1.408	-1.669	33.314
Respondent 44	4	3	3	3	3	3	3	3	25	3.125	0.354	-1.384	36.163
Respondent 45	4	0	0	0	0	0	0	0	4	0.5	1.414	-1.683	33.171
Respondent 46	4	3	3	3	3	3	3	3	25	3.125	0.354	-1.384	36.163
Respondent 47	4	3	3	3	3	3	3	3	25	3.125	0.354	-1.384	36.163
Respondent 48	4	4	1	3	3	3	3	3	24	3	0.926	-1.398	36.021
Respondent 49	1	3	2	1	3	1	3	3	17	2.125	0.991	-1.498	35.023
Respondent 50	3	3	3	3	3	1	3	1	20	2.5	0.926	-1.455	35.451
Respondent 51	0	0	0	0	2	0	0	0	2	0.25	0.707	-1.711	32.886
Respondent 52	3	3	3	3	3	3	3	3	24	3	0.000	-1.398	36.021
Respondent 53	1	1	0	1	0	0	0	0	3	0.375	0.518	-1.697	33.029
Respondent 54	0	2	0	0	0	0	0	0	2	0.25	0.707	-1.711	32.886
Respondent 55	1	1	1	1	1	1	1	3	10	1.25	0.707	-1.597	34.026
Respondent 56	0	0	0	0	4	0	0	0	4	0.5	1.414	-1.683	33.171
Respondent 57	3	3	1	0	4	0	0	0	11	1.375	1.685	-1.583	34.169
Respondent 58	0	1	2	2	0	1	0	0	6	0.75	0.886	-1.654	33.456
Respondent 59	3	0	1	3	2	3	3	3	18	2.25	1.165	-1.483	35.166
Respondent 60	0	4	0	5	0	0	0	0	9	1.125	2.100	-1.612	33.884
Respondent 61	3	1	3	3	3	5	3	5	26	3.25	1.282	-1.369	36.306
Respondent 62	0	0	0	2	5	4	0	0	11	1.375	2.066	-1.583	34.169
Respondent 63	0	0	0	0	0	0	0	0	0	0	0.000	-1.740	32.601
Respondent 64	3	3	3	3	3	3	3	3	24	3	0.000	-1.398	36.021
Respondent 65	3	1	3	3	3	3	3	3	22	2.75	0.707	-1.426	35.736
Respondent 66	0	0	0	0	4	0	0	0	4	0.5	1.414	-1.683	33.171
Respondent 67	1	4	1	1	1	5	3	3	19	2.375	1.598	-1.469	35.308
Respondent 68	5	5	3	3	3	3	3	3	28	3.5	0.926	-1.341	36.591

Item MEAN	3.132	1.912	1.529	1.735	1.985	1.779	1.618	1.574
Item STANDARD DEVIATION	1.485	1.572	1.332	1.502	1.569	1.573	1.466	1.499
Item VARIATION	2.206	2.470	1.775	2.257	2.462	2.473	2.150	2.248
SUM Item VARIATION	18.042							
TEST Mean	15.265							
TEST STANDARD DEVIATION	8.773							
TEST VARIATION	76.974							
K (# items)	68							
K-1	67							

Cronbach's Alpha	0.777	> 0.9 – Excellent, > 0.8 – Good, > 0.7 – Acceptable, > 0.6 – Questionable, > 0.5 – Poor, and <0. 5 – Unacceptable

Standard error of measurement	*=(Std.Dev. Of Test)(Sq. Root of 1-Cronbach's alpha)*
Standard error of measurement	4.143
95% C.I. for 1st person (upper limit)	10.620
95% C. I. for 1st person (lower)	-5.620
95% C.I. for 10th person (upper limit)	8.620
95% C. I. for 10th person (lower)	-7.620
95% C.I. for 20th person (upper limit)	9.620
95% C. I. for 20th person (lower)	-6.620

APPENDIX A6 – RAW DATA (QUESTIONNAIRE SURVEY)

The following shows the raw data that was received from the feedback from the questionnaire survey.

Question 2 – Please provide the name of your organisation.

Q2 Please provide the name of your organisation	
Organisation Name	Firm
AMAP Count	1
ATKINS (METRONET) Count	1
BAA Count	3
bnconsult.ltd Count	1
Cabinet Office Count	1
Carillion Plc Count	1
CLA Urban Development Count	1
Doosan Babcock Count	1
EC Harris Count	4
Educo UK Count	1
Elevate East Lancashire Count	1
Ferrovial Agroman Count	9
GeoMechanics Inc. Count	1
Greco Consulting Services Ltd Count	1
GVA second London Wall Count	1
Highways Agency Count	1
Hunter & Partners Limited Count	1
Interserve Project Services Limited Count	1
ISG Count	1
Jacobs UK Tower Bridge Count	1
Kingston University Count	1
KPMG Count	1
Laing O'Rourke Scotland Ltd Count	1
Lend Lease Projects Count	1
London South Bank University Count	1
Mace Count	1
McCarthy & Associates Count	1
Middlesex Engineering Consultants Ltd Count	1
MorganEst Count	1
Mott McDonald Count	1
Nespak Count	10
North East Wales Inst. of H.E. Count	1
PRP Architects Count	1
QinetiQ Count	1
Schal Count	5
Tfl Count	1
The Nichols Group Count	1
Turner & Townsend Count	4
Tweed Consultants Count	1
Unite Group Plc Count	1
Wisewolf Consulting Count	1
Grand Count	70

Question 4 - Please indicate the number of approximate employees in your organisation

4.0 Please indicate the approximate number of employees in your organisation		
Grand Count	70	
Less than 50 Count	12	
Between 50 and 100 Count	8	
Between 100 and 500 Count	7	
Between 500 and 1,000 Count	1	
Greater than 1,000 Count	40	
No Data Count	2	
Count	0	
Between 500 and 1,000	1	1%
Between 100 and 500	7	10%
Between 50 and 100	8	12%
Less than 50	12	18%
Greater than 1,000	40	59%
	68	

Question 5 – Please indicate the approximate turner of your organisation

5.0 Please indicate the approximate turnover of your organisation		
Grand Count	70	
Less than £50,000 Count	1	
Between £50,000 and £100,000 Count	3	
Between £100,000 and £500,000 Count	3	
Between £500,000 and £1,000,000 Count	2	
Greater than £1,000,000 Count	57	
No Data Count	4	
Less than £50,000	1	2%
Between £50,000 and £100,000	3	5%
Between £100,000 and £500,000	3	5%
Between £500,000 and £1,000,000	2	3%
Greater than £1,000,000	57	86%
	66	

Question 6 – Which classification best describes your organisation?

6.0 Which classification best describes your organisation?		
Grand Count	70	
Academia Count	3	
Architect Count	2	
Central Government Count	1	
Client Count	5	
Contractor Count	14	
Engineering Consultant Count	13	
Management Consultant Count	7	
No Data Count	3	
Project Manager Count	21	
Property development Count	1	
Central Government	1	1%
Property Development	1	1%
Architect	2	3%
Academia	3	4%
Client	5	7%
Management Consultant	7	10%
Engineering Consultant	13	19%
Contractor	14	21%
Project Manager	21	31%
	67	

Question 7 - Which type of work are you normally involved in?

Q7. Which type of work are you normally involved in?		
2	Academia	2%
6	Facilities Management	5%
6	Engineering Consultancy	5%
9	Management Consultancy	7%
18	Other	14%
20	Construction - refurbishment / fit-out	16%
24	Construction - New Build	19%
42	Project management services	33%

Question 8 – To which professional organisations do you personally belong to?

Q8. To which professional institutions do you personally belong to?				
2	RIBA, Royal Institution of British Architects	2%	2%	
4	PMI, Project Management Institute	4%	4%	
9	CIOB, Chartered Institute Of Building	9%	9%	
16	RICS, Royal Institution of Chartered Surveyors	16%	16%	
16	ICE, Institute of Civil Engineers	16%	16%	
19	APM, Association for Project Management	18%	18%	
	Other		36%	
1	CIBSE, Chartered Institute of Building Services Engineers	1%		
1	Insitute of Highway Incorporated Engineers	1%		100%
1	IMechE, Institute of Mechanical Engineers	1%		
1	CMI, Chartered Management Institue	1%		
1	Colegio de Ingenieros de Caminos, Canales y Puertos	1%		
1	Association for Project Safety	1%		
1	BIFM, British Instiute of Facilities Management	1%		
1	CIPS, Chartered Institute of Purchasing & Supply	1%		
1	CPID, Chartered Institute of Personnel & Development	1%		
1	Ordem dos Engenheiros, Portugal	1%		
1	IQS	1%		
1	IOSH	1%		
1	IIRSM	1%		
1	Construction Health & Safety Group (Chertsey)	1%		
1	Institute of Materials, Minerals & Mining	1%		
1	Hong Kong Institution of Engineers	1%		
1	Association of Consulting Engineers	1%		
1	Institution of Structural Engineers	1%		
1	American Society of Engineers	1%		
1	Association of Cost Engineers	1%		
1	Institution of Engineering & Technology	1%		
1	EurIng, Ceng	1%		
1	ACHE, International Concrete Association	1%		
1	ACHE, Spanish Association of Concrete	1%		
2	IOD, Institute of Directors	2%		
2	IBC, Institute of Buisiness Consulting	2%		
2	IABSE, International Association for Bridge and Structural Engineering	2%		
3	IRM, Institute of Risk Management	3%		
4	Pakistan Engineering Council	4%		

Question 9 – What project management software does your firm use?

Q9. What project management software does your firm use?		
1	Suretrak	1%
1	Project Commander	1%
6	Artemis	5%
9	In-house System	8%
21	Power Project	18%
24	Primavera	21%
54	Microsoft Project	47%

Question 10 – Which project management ideology does your organisation follow?

Q10. Which project management ideology does your organisation follow?		
1	Project Controls	1%
2	Managing Successful Programmes	2%
3	PRINCE2	3%
7	Project Management Institute, Body of Knowledge	8%
9	British Standard 6079: A Guide to Project Management	10%
21	Association for Project Management, Body of Knowledge	24%
45	Bespoke in-house processes / procedures	51%

Question 11 – Do you have a programme office within your organisation?

11.0 Do you have a programme office within your organisation?		
Grand Count	70	
No Count	44	
No Data Count	7	
Yes Count	19	
Count	0	
Yes	19	30%
No	44	70%
	63	

Question 12 – How often does your organisation review its project management procedures?

12.0 How often does your organisation review its project management procedures?		
Grand Count	70	
Every 2 years Count	2	
Every 6 Months Count	5	
No Data Count	5	
Other Count	9	
When there is a business need to do so Count	39	
Yearly Count	10	
Count	0	
Every 2 years	2	3%
Every 6 months	5	8%
Other	9	14%
Yearly	10	15%
When there is a business need to do so	39	60%
	65	

Question 13 – What is important when you are managing projects?

Q13. What is important when you are managing projects?				
	Developing a high performance team	Having the right calibre of staff	Minimising changes to the project scope	Managing the clients expectations
Strongly Agree	0%	0%	9%	58%
Agree	30%	40%	44%	35%
Neither Agree or Disagree	13%	2%	34%	6%
Disagree	0%	0%	5%	0%
Strongly Disagree	58%	58%	8%	0%

Question 14 – What do you consider to be the most common symptoms of project failure?

Q14. What do you consider to be the most common symptoms of project failure?		
9	Other	5%
13	Too much emphasis on following procedures	7%
16	Rigid project management processes	8%
19	Lack of sponsorship	10%
23	Incomplete business case	12%
34	Lack of stakeholder engagement	18%
37	Not having the right resources	19%
40	Lack of front end planning	21%

Question 15 – In general, what are the main reasons why organizations follow a project management process?

Q15. In general, what are tha main reasons why organisations follow a project management process?		
8	To comply with third party requirements	5%
9	Other	6%
26	The need to comply with internal company procedures and general controls	18%
27	To comply with client requirements	18%
33	To ensure that everyone performs work activities in a similar manner	22%
44	To minimise risk to the organisation	30%

Question 16 – In terms of your organisation, how were your project management processes and procedures originally developed?

Q16. In terms of your organisation, how were your project management processes and procedures originally developed?		
5	Other	5%
18	Based on known methodologies ie PRINCE2, PMI etc	18%
31	Out of client requirements	30%
48	Following in-house research and development work	47%

Question 17 – Have you undertaken a project management maturity assessment of your organisation?

17.0 Have you undertaken a project management maturity assessment of your organisation?	
59	No
4	Yes
7	No Data

Question 18 – Which of the following project management ideology / methods are you familiar with?

Q18. which of the following project management ideology / methods are you familiar with?			
1	eXtreme Project Management	1%	
6	Theory of Constraints	4%	
10	Critical Chain Project Management	6%	
19	Managing Successful Programmes (MSP)	11%	
20	British Standard 6079: A Guide to Project Management	12%	21%
25	Project Management Institute, Body of Knowledge	15%	79%
28	Association for Project Management, Body of Knowledge	17%	
29	PRINCE2	17%	
30	Earned Value	18%	
		100%	100%

Question 19 – How often do you use the following?

19.0 How often do you use the following:								
Always	2	2	0	3	3	3	0	1
Regularly	0	0	0	0	0	0	0	0
Often	0	0	0	0	0	0	0	0
Sometimes	11	10	10	12	8	7	3	6
Never	27	26	24	21	26	31	35	32
	40	38	34	36	37	41	38	39
	PRINCE2	Managing Successful Programmes (MSP)	Project Management Institute, Body of Knowledge	Association for Project Management, Body of Knowledge	British Standard 6079, A Guide to Project Management	Critical Chain Project Management	eXtreme Project Management	Theory of Constraints
Always	5%	5%	0%	8%	8%	7%	0%	3%
Regularly	0%	0%	0%	0%	0%	0%	0%	0%
Often	0%	0%	0%	0%	0%	0%	0%	0%
Sometimes	28%	26%	29%	33%	22%	17%	8%	15%
Never	68%	68%	71%	58%	70%	76%	92%	82%

Question 20 – Please read each of the following statements and provide your answers:

Q20. Please reach each of the following statements and provide your answers	a) There is too much emphasis on project management processes to the extent that it becomes an unecessary adminstration burden	b) Traditional project management methods are no longer appropriate for todays projects	c) The volume of procedures on projects is driven by client requirements	d)The volume of procedures on projects is driven by internal company policy	e) Project success can be improved by the use of more agile solutions rather than relying on traditional project management methods	f) Better calibre of project resource is required to ensure that projects are delivered successfully	e) Project teams should be given more freedom to devise their own project management processes rather than forcing them to comply with standards
Strongly Agree	3	4	7	6	14	24	6
Agree	22	13	24	38	37	30	24
Neither Agree or Disagree	21	16	15	16	11	7	15
Disagree	17	28	17	4	2	3	16
Strongly Disagree	1	3	1	0	0	0	3
	64	64	64	64	64	64	64
Strongly Agree	5%	6%	11%	9%	22%	38%	9%
Agree	34%	20%	38%	59%	58%	47%	38%
Neither Agree or Disagree	33%	25%	23%	25%	17%	11%	23%
Disagree	27%	44%	27%	6%	3%	5%	25%
Strongly Disagree	2%	5%	2%	0%	0%	0%	5%
	100%	100%	100%	100%	100%	100%	100%

Question 21 – How satisfied are you with your organisation's project management procedures?

21.0 How satisfied are you with your organisations project management procedures ?					
Score	Count				
1	0				
2	0				
3	5				
4	2				
5	11				
6	12				
7	14				
8	11				
9	5				
10	4				

Question 22 – Generally speaking, if you would *like* to see an improvement in project management processes and procedures, what would these be?

	24%	11%	1%	3%	26%	1%	1%	3%	5%	7%	5%	3%	2%	2%	3%	1%	100%
	21	10	1	3	23	1	1	3	4	6	4	3	2	2	3	1	88
Q22. Generally speaking, if you would like to see an improvement in project management processes and procedures, what would these be?	Flexible processes	Better communications	Qualified Project Managers	Better Client Awareness	Basic processes	Project management Recognition	Shared Good Practice	Better teamwork	Meaningful processes	Better project management capability	Better processes	Training	Use of other PM techniques	Better resources	Standardisation	Better budgeting	
1) Application of processes and processes based on an understanding of the client organisation and its environment. 2) Open, honest discussion around the objectives of the programme/project and then consideration of the risk factors. 3) Qualified programme and project management professionals. 4) Greater appreciation on the part of the client of the professional standards and approaches available to PM professionals. 5) Independent advice to clients on PMO/ PM set-up, particularly on public sector programmes. 6) Greater training for clients on the procurement of PM professionals. 7) Less emphasis on 'tick-box' reviews of programme and more of 4), 5) and 6) above.	x	x	x	x													
I think that PM processes could be improved if they followed an electronic 'workflow' i.e. system controls to either prevent deviations and / or sign off if these are approved. Too much flexibility in process can lead to a lack of control, although I	x																
I would like to see basic processes more widely adopted					x												
Recognition of the importance of project management in delivering successful schemes within the organization. Shared good practice within the organization.						x	x										
More supportive to multi-disciplinary working.								x									
I like the idea of agility. I think that the emphasis on what requires processes & procedures should be based on a risk assessment (ours are not). This would ensure that those things which needed control are controlled & PM's are focused on those things which									x								
More emphasis on behavioural competencies than technical										x							
Reduction in admin relating to processes/procedures, e.g. Change Control; Bring in Project Controls..... at least at a high level; Educated Client and Project Teams who understand the PM Processes and Procedures; Slick project reporting;	x	x		x					x		x						

Complete integration between all aspects so (a) there is a clear, logical flow of activity relevant to the key risks which exist at any point in the project development progress (b) elimination of duplication and/ or unnecessary activity and (c) no conflict between different components of the project management spectrum.	x	x			x											
Improved emphasis on training PMs to understand what Project Management is about; Allow them the flexibility to perform at the appropriate level(s); Use some of the more modern techniques (chain theory, etc.) to have a certain 'agreed' period at the beginning of the project to set it up right; Allow them to report the truth rather than introducing a lot of noise in the reports - trust them; More systems thinking; In terms of support the APM BoK to become more informed (it can improve more) Hope the above help. Good luck with your research												x	x			
More tranparancy between Client/PM and Contractor systems so that must have information can be provided in a timely manner and not a sucession of drip fed rejections which slows up the delivery process.		x														
A true convergence of traditional PM skills with a goof blend of Managment Consultancy in terms of Performance Mgt and Risk Mgt as examples - all underpinned by a Benefits Case.	x	x			x				x		x					
Colaboration tool. To sharing documentation and ensure that the MORE important information is properly recorded from start (bidding) to completion (handover)	x				x			x	x		x					
standard terminology															x	
Simple processes and procedures work best but only with experience. Best procedures guide and advise rather than being prescriptive - more education fewer rules eg RIBA Plan of Work is a very useful framework for a construction project programme process but often this needs to be adapted to suit modern contract routes.	x				x											
Better front end budgetting																x
Keep them simple.											x					
I feel that staff training in latest uses of technology and procedures is the way to improve project management	x											x				

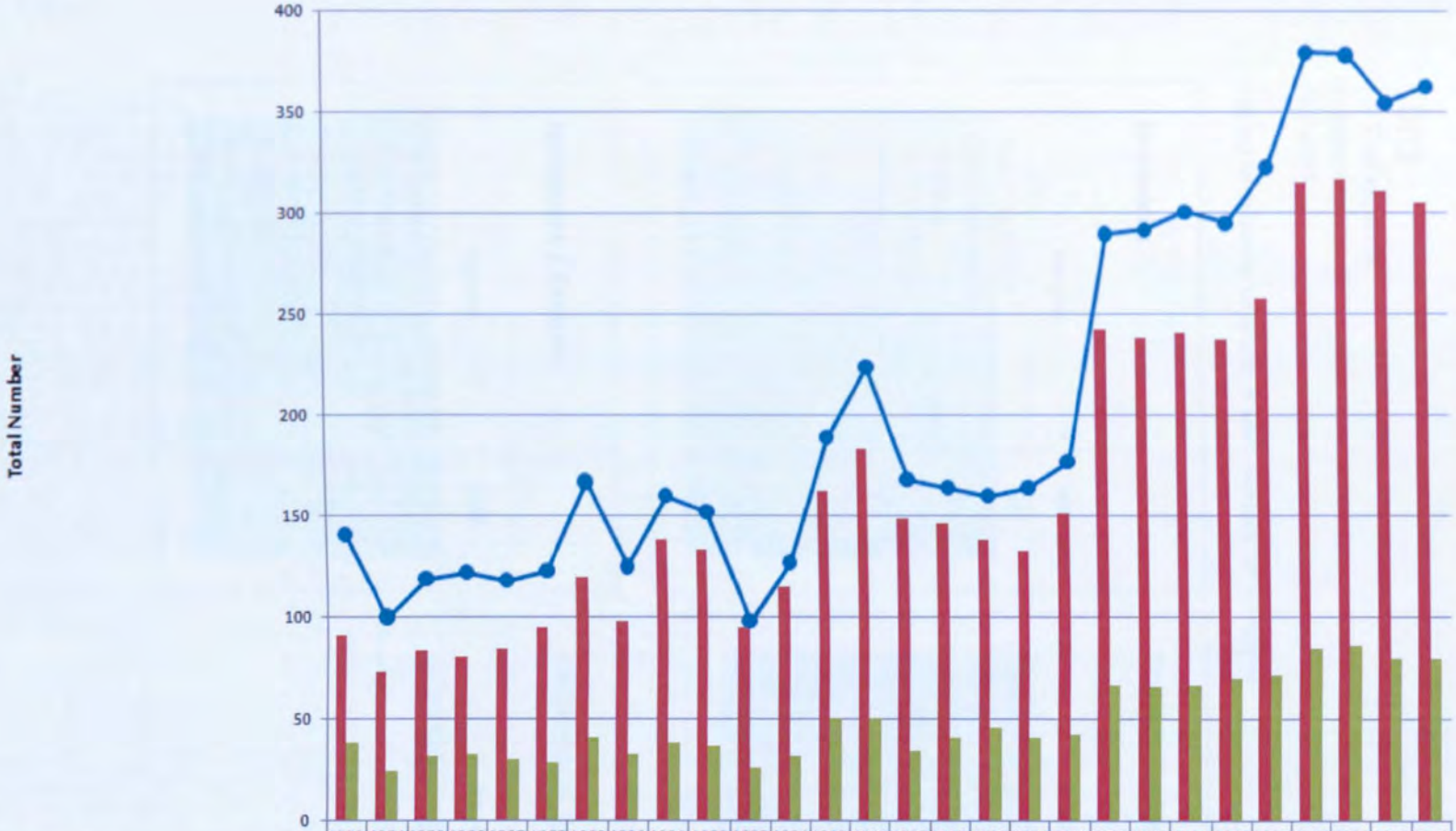
Much as the thrust behind this questionnaire - a core set of procedures to meet client, industry and company requirements and sufficient flexibility to shape the requirements to the specific project needs.	x															
Project management techniques applied with confidence and flexibility													x			
1. More disciplined approach to project briefing to establish baseline for change management 2. Greater focus on client engagement or agreed delegated					x											
Client handling Manpower allocation, Freedom to acquire appropriate tool of the trade				x										x		
It is probably more related to how processes are used rather than the detail of them. The use of third party accreditation can be very constraining if the client's needs are different to our own internal systems. Likewise with regard to our supply chain partners. Dealing with this issue would singularly improve the operational success of projects.	x				x											
the project manager should be more powerfull in term of cross discipline assignment, reward & penalty and regarding finacial matters										x						
engage with stake holders		x														
Project managers within the organisation should be recruited at a higher level and sponsorship of projects sanctioned a higher level. This could be enshrined in procedures.		x								x		x				
The procedures should involve methods of Quality Assurance Standards to be followed at each step of analysis, design, preparation of drawings and Tender Documents.It would produce economical design resulting in lesser duration of construction of quality product. Coordination with Client in terms of TOR, approvals, release of payment and finally satisfaction of Client in case of deliverables is extremely important.The process should also involve how to develop State Of The Art of Engineering in resolving site solutions and ways to develop confidence with the Client.	x				x											
Get the basic high level principles right and allow a level of freedom and flexibility to be used by the competent project manager without exposing the business to additional current and residual risks ensuring that safety, quality and value are maintained.										x						
Should be based on a Standard Methodology customised to suit your project requirements and keeping it simple in the process.															x	
An overall streamlining of processes and procedures, thereby reducing complexities and time input and providing savings on programme, efficiencies and money.	x				x											
System/process simplification providing easy of use, clear reporting and understandable with little or no administrative cost impacts.	x				x											
As simple as practically possible					x											
More flexibility without increasing risk	x				x											
Getting across the message that you do project management activities because they make sense and add value - not because they are compulsory administrative bureaucracy.										x						
Integration of cost and time Management of change Business case modelling					x											

Information sharing between essential company stakeholders to a project such that project management should harmonise commercial, planning, finance, estimating and other departments for a clearer understanding of processes and procedures	x	x			x												
Our project management processes require greater maturity before I could comment on improvements.										x							
I prefer a GRIP®-style approach: state the expected outcomes and the accountabilities, then let project teams and sponsors work out how to demonstrate that they're able to deliver.	x				x												
Adjusted to cater for collaborative working on projects - Client, PM, Contractors								x									
Project management is not rocket science. It's all about delivering a project on time, on budget, to specification and to a good quality with zero defects. We all know what to do, it's just having sufficient time to do it all properly which is never the case.	x				x												
develop a common industry standard integrated into a common software platform.																x	
A simplification of procedures and reduction of the influence of peer assessment that frequently diverts efforts from a project to justify actions to non experts.	x				x												
ensure that project managers actually understand the design issues & decisions being made, rather than just acting as a post box Ensure project managers are involved in all design & construction	x				x												
Better alignment of project activities to cost of the activities. More robust way of managing progress against cost.					x												

communication		x															
There is an obvious huge gap in the recognition and application of Project Control Processes and Procedures in many large projects. The defined processes may be acceptable but are not applied effectively. Improvements would come from:	x				x												
It would be good to pay more attention to evaluate the necessary resources to accomplish the required schedule.															x		
To have an homogenous idea of the project management philosophy to use, specially clearing each persons responsability inside the project					x												
Simplistic, and transparent processes that do not rely heavily on paperwork and complex procedures.	x	x			x												
Recognition that project management needs to be wider than construction project management.					x												

APPENDIX A7 – KEYWORD ANALYSIS (IJPM JOURNAL)

Keyword Analysis - Overall summary and key statistics



	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Total Keywords under similar headings	91	73	84	81	85	95	120	98	139	134	95	115	163	184	149	147	139	133	152	243	239	241	238	258	315	317	311	306
Number of papers	39	25	32	33	31	29	41	33	39	37	27	32	51	51	35	41	46	41	43	67	66	67	70	72	85	86	80	80
Total Number of key words	141	100	119	122	118	123	167	125	160	152	98	127	189	224	168	164	160	164	177	290	292	301	295	323	380	379	355	363

1983

141 Total keywords
91 keywords
39 Papers

The top ten occuring keywords in each category are as follows:

Keywords

Keywords	1983
Project Management	25
Organizations and methods	7
Planning	6
Control systems	3
Forecasting	3
Construction	2
Contracts	2
Cost accounting	2
Decision-making	2
Network analysis	2
Plans	2

Tools & Techniques

Keywords	1983
Organizations and methods	7
Planning	6
Control systems	3
Forecasting	3
Cost accounting	2
Decision-making	2
Network analysis	2
Scheduling	2
Architectural design and planning	1
Competrized programmes	1

Industries / Sectors

Keywords	1983
Construction	2
Public transport	2
Construction engineering works	1
Construction sites	1
International projects	1
Manufacturing industries	1
Nuclear electric power stations	1
Offshore construction works	1

Countries & Regions

Keywords	1983
Scandinavia	1

1984

100 Total keywords
73 keywords
25 Papers

The top ten occuring keywords in each category are as follows:

Keywords

Keywords	1984
Project Management	9
Construction	4
Personnel management	4
Planning	4
Management by objectives	3
Organization	3
Communication	2
Contracts	2
Management operations	2
System analysis	2
Systems design	2

Tools & Techniques

Keywords	1984
Project Management	9
Planning	4
System analysis	2
Systems design	2
Administrative tools	1
Bar charts	1
Computer applications and management	1
Computer applications simulation	1
Computer modelling	1
Computer-assisted learning	1
Contract schedules	1

Industries / Sectors

Keywords	1984
Construction management	1
Construction projects	1
Distribution systems (gas)	1
Nuclear electric power stations	1
Offshore pipelines	1
Rural development	1
Construction	4

Countries & Regions

Keywords	1984
Argentina	1
Australia	1
Hong Kong	1
Malawi	1
Papa New Guinea	1

1985

119 Total keywords
84 keywords
32 Papers

The top ten occuring keywords in each category are as follows:

Keywords

Keywords	1984
Project Management	9
Construction	4
Personnel management	4
Planning	4
Management by objectives	3
Organization	3
Communication	2
Contracts	2
Management operations	2
System analysis	2
Systems design	2

Tools & Techniques

Keywords	1985
Estimation	2
Forecasting	2
Activity list	1
Chart of accounts	1
Classification systems	1
Communication processes	1
Data analysis	1
Data presentation	1
Estimates	1
Information handling	1

Industries / Sectors

Keywords	1985
Educational facilities	1
Industrial building	1
Major projects	1
Public projects	1
Civil engineering	2
Construction	6

Countries & Regions

Keywords	1985
Australia	2
Egypt	1
India	1
Pakistan	1
Turkey	1
USSR	1

1986

122 Total keywords
81 keywords
33 Papers

The top ten occuring keywords in each category are as follows:

Keywords

Keywords	1986
Project Management	14
Management	13
Management techniques	4
Risk analysis	4
Construction	3
Contracts	2
Decision-making	2
Economic resources	2
Network analysis	2
Pharmaceutical industry	2
Planning	2

Tools & Techniques

Keywords	1986
Management	13
Risk analysis	4
Decision-making	2
Network analysis	2
Automated project management system	1
Control tool	1
Data processing	1
Decision break	1
Dictionaries	1
Mathematical calculations	1
Models	1

Industries / Sectors

Keywords	1986
Construction	3
Pharmaceutical industry	2
Drug development	1
Education	1
Infrastructure	1
Motor	1
North Sea	1
Offshore construction works	1
Software	1
Sport	1

Countries & Regions

Keywords	1986
Australia	1
Egypt	1
Iran	1
Non developed countries	1
Sudan	1
Switzerland	1

1987

118 Total keywords
85 keywords
31 Papers

The top ten occuring keywords in each category are as follows:

Keywords

Keywords	1987
Project Management	16
Management techniques	13
Construction	3
Education	2
Engineering	2
Maintenance	2
Software	2
Alvery	1
Auditing	1
Automation	1
Banking	1

Tools & Techniques

Keywords	1987
Management techniques	13
Auditing	1
Change control	1
Computer model	1
Computer systems	1
Conceptual design	1
Costing	1
Critical path method	1
Design freeze	1
Expert systems	1

Industries / Sectors

Keywords	1987
Construction	3
Education	2
Engineering	2
Maintenance	2
Software	2
Automation	1
Banking	1
Build-own-operate and transfer contracts	1
Civil engineering	1
Construction management	1

Countries & Regions

Keywords	1987
Brazil	1
Developing countries	1
Egypt	1
Italy	1
OECD projects	1

1988

123 Total keywords
95 keywords
29 Papers

The top ten occuring keywords in each category are as follows:

Keywords

Keywords	1988
Project Management	18
Management techniques	4
Construction	2
Construction management	2
Contractors	2
Control	2
Organization	2
Performance	2
Planning	2
Software	2
Algorithm	1

Tools & Techniques

Keywords	1988
Management techniques	4
Control	2
Performance	2
Planning	2
Algorithm	1
Chain of conformance	1
Contingency tables	1
Cost engineering optimization	1
Critical path	1
Critical sequence	1
Discounting techniques	1

Industries / Sectors

Keywords	1988
Construction	2
Construction management	2
Bloodmobile projects	1
Building projects	1
Capital projects	1
Communications	1
Construction industry	1
Engineering design	1
Joint ventures	1
Major projects	1

Countries & Regions

Keywords	1988
China	1
Greater Cairo	1

1989

167 Total keywords
120 keywords
41 Papers

The top ten occuring keywords in each category *are as follows*:

Keywords

Keywords	1989
Project Management	25
Expert systems	4
Training	4
IT projects	3
Knowledge Based Systems	3
Conception stage	2
Construction management	2
Course structure	2
Design	2
Developing countries	2
Experience	2

Tools & Techniques

Keywords	1989
Expert systems	4
Knowledge Based Systems	3
Information technology	2
Auditing	1
Benefit / cost appraisal	1
Computer aided design	1
Control	1
Cost	1
Database software	1
Databases	1

Industries / Sectors

Keywords	1989
Information technology projects	2
Civil engineering industry	1
Construction industry	1
Education and training	1
Engineering and construction firm	1
Engineering contractor	1
Environment	1
European Space Agency	1
Institution building	1
Manufacturing industry	1

Countries & Regions

Keywords	1989
Developing countries	2
EEC	1
Swiss technical university	1
Turkey	1

1990

125 Total keywords
98 keywords
33 Papers

The top ten occuring keywords in each category are as follows:

Keywords

Keywords	1990
Risk management	3
Construction	3
Risk analysis	3
Project planning	2
Engineering	2
Quality assurance	2
Uncertainty	2
Critical success factors	2
Performance	2
Research and development	2

Tools & Techniques

Keywords	1990
Risk analysis	3
Project planning	2
Critical success factors	2
IT planning	2
Monte Carlo simulation	2
Scheduling	1
Project control	1
Risk evaluation	1
Estimating	1
Delay claims	1

Industries / Sectors

Keywords	1990
Construction	3
Engineering	2
Research and development	2
Construction Management	1
Construction projects	1
Development projects	1
Public sector	1
Education	1
R&D	1
Systems engineering	1

Countries / Regions

Keywords	1990
Middle East	1
Tanzania	1

1991

160 Total keywords
139 keywords
39 Papers

The top ten occuring keywords in each category are as follows:

Keywords

Keywords	1991
Organization	3
Planning	2
Project planning	2
Risk analysis	2
Leadership	2
Project organization	2
Motivation	2
Project manager	2
Project development	2
Project start-up	2

Tools & Techniques

Keywords	1991
Planning	2
Project planning	2
Risk analysis	2
Project start-up	2
Risk management	1
Scheduling	1
Programme Management	1
Risk evaluation	1
Sensitivity analysis	1
Construction planning	1

Industries / Sectors

Keywords	1991
Construction	1
Construction project management	1
Construction projects	1
Development projects	1
Programme Management	1
Build-operate-transfer projects	1
Telecommunications	1
Construction / contracting industry	1
Offshore engineering	1

Countries / Regions

Keywords	1991
United States	1

1992

152 Total keywords
134 keywords
37 Papers

The top ten occuring keywords in each category are as follows:

Keywords

Keywords	1992
Project Management	9
Quality	3
Training	3
Influence diagrams	2
Knowledge-based systems	2
Management	2
Project environment	2
Project planning	2
Risk management	2
Analytical hierarchical processes	1
Applications	1

Tools & Techniques

Keywords	1992
Influence diagrams	2
Knowledge-based systems	2
Project planning	2
Risk management	2
Analytical hierarchical processes	1
Capacity planning	1
Conceptual models	1
Contingency tables	1
Cost estimating	1
Cost modelling	1

Industries / Sectors

Keywords	1992
Build-own-transfer projects	1
Construction	1
Construction Management	1
Construction project management	1
Development projects	1
Education	1
Electricity	1
Engineering management	1
Environment	1
Information technology	1

Countries / Regions

Keywords	1992
Developing countries	1
Gulf	1
Kuwait	1

1993

98 Total keywords
95 keywords
27 Papers

The top ten occuring keywords in each category are as follows:

Keywords

Keywords	1993
PERT	2
Planning	2
Accounting procedures	1
Build-operate-transfer projects	1
Business management	1
Capital projects	1
Centres of excellence	1
Certification	1
Chaos theory	1
Classification	1

Tools & Techniques

Keywords	1993
Control	2
PERT	2
Planning	2
Accounting procedures	1
Chaos theory	1
Classification	1
Configuration management	1
Construction planning	1
Construction plans	1
Critical/non critical path activities	1

Industries / Sectors

Keywords	1993
Build-operate-transfer projects	1
Capital projects	1
Construction projects	1
Information-systems development projects	1
Joint ventures	1
Multicompany projects	1
Multilocation environments	1
Multiproject management	1
Publicly funded projects	1
Telecommunications	1

Countries / Regions

Keywords	1993
No keywords	

1994

127 Total keywords
115 keywords
32 Papers

The top ten occuring keywords in each category are as follows:

Keywords

Keywords	1994
Construction	5
Conflict	2
Contracts	2
Planning	2
Project planning	2
Risk analysis	2
Risk management	2
Saudi Arabia	2
Value engineering	2
Activity networks	1

Tools & Techniques

Keywords	1994
Planning	2
Project planning	2
Risk analysis	2
Risk management	2
Value engineering	2
Activity networks	1
Balancing portfolio indices	1
Benchmarks	1
Business-process engineering	1
Computer-supported cooperative work	1

Industries / Sectors

Keywords	1994
Construction	5
Archaeology	1
Asia	1
Combined-cycle power stations	1
Construction	1
Construction Management	1
Construction project management	1
Contract management	1
Defence	1
Engineering contractors	1

Countries / Regions

Keywords	1994
Saudi Arabia	2
Asia	1
Europe	1
Japan	1
Nigeria	1
North America	1

1995

189 Total keywords
163 keywords
51 Papers

The top ten occuring keywords in each category are as follows:

Keywords

Keywords	1995
Body of knowledge	7
Risk management	5
Construction	3
Risk	3
Contractors	2
Control	2
Learning	2
PERT	2
Planning	2
Professional certification	2

Tools & Techniques

Keywords	1995
Body of knowledge	7
Risk management	5
Risk	3
Control	2
Learning	2
PERT	2
Planning	2
Systems thinking	2
Activity-on-the-node representations	1
Body of knowledge classification structure	1

Industries / Sectors

Keywords	1995
Construction	3
Artistic project	1
Build-operate-transfer	1
Build-operate-transfer projects	1
China	1
Civil engineering	1
Construction Management	1
Construction project management	1
Education	1
Hong Kong industries	1

Countries / Regions

Keywords	1995
China	1
Hong Kong industries	1
Singapore	1
Southeast Asia	1

1996

224 Total keywords
184 keywords
51 Papers

The top ten occuring keywords in each category are as follows:

Keywords

Keywords	1996
Project Management	13
Business process re-engineering	6
Risk management	4
Developing countries	3
Risk	3
Bureaucracy	2
Cultural change	2
Empowerment	2
Integration	2
PC-based project management systems	2
Planning	2

Tools & Techniques

Keywords	1996
Project Management	13
Business process re-engineering	6
Risk management	4
Risk	3
Cost	2
Empowerment	2
PC-based project management systems	2
Planning	2
Programme Management	2
Project planning	2
Re-engineering	2

Industries / Sectors

Keywords	1996
Build-operate schemes	1
Construction	1
Construction industry	1
Engineering	1
High technology projects	1
Information technology	1
Infrastructure projects	1
Pipeline construction	1
Power generation	1
Public transport organisation	1

Countries / Regions

Keywords	1996
Developing economy	1
Nepal	1

1997

168 Total keywords
149 keywords
35 Papers

The top ten occuring keywords in each category are as follows:

Keywords

Keywords	1997
Project Management	5
Configuration management	3
Construction	3
Risk management	3
BOT	2
Effectiveness	2
Empowerment	2
Leadership	2
Organizational structure	2
Project planning	2
R&D	2

Tools & Techniques

Keywords	1997
Project Management	5
Configuration management	3
Risk management	3
Effectiveness	2
Empowerment	2
Organizational structure	2
Project planning	2
Risk analysis	2
Scheduling	2
Activity sampling	1
Benefits	1

Industries / Sectors

Keywords	1997
BOT	2
R&D	2
Arts projects	1
Construction project	1
Electrical	1
Housing projects	1
Jinqias Export Processing zone	1
Mechanical	1
Oil industry	1
Research institutes	1

Countries / Regions

Keywords	1997
Gaza strip	1
Hong Kong	1
Jinqias Export Processing zone	1
Thailand	1

1998

164 Total keywords
147 keywords
41 Papers

The top ten occuring keywords in each category are as follows:

Keywords

Keywords	1998
Project Management	8
Risk	3
Behaviour	2
CAS continual audit system	2
Change management	2
Construction	2
Crisis	2
KBS Knowledge Based System	2
Planning	2
Production planning and control	2
Activity networks	1

Tools & Techniques

Keywords	1998
Project Management	8
Risk	3
CAS continual audit system	2
Change management	2
KBS Knowledge Based System	2
Planning	2
Production planning and control	2
Activity networks	1
Alternative Dispute Resolution	1
Belbin	1
Brainstorming	1

Industries / Sectors

Keywords	1998
Construction	2
Concurrent engineering	1
Construction industry	1
Engineering	1
Entertainment industry	1
EPCM Engineer Procure Contract Manage	1
Financial markets	1
High rise construction	1
Power projects	1
Public sector	1

Countries / Regions

Keywords	1998
Dabhol power project	1
Developing countries	1
Indonesia	1

1999

160 Total keywords
139 keywords
46 Papers

The top ten occuring keywords in each category are as follows:

Keywords

Keywords	1999
Project Management	13
Risk	3
Risk management	3
Strategic planning	3
Construction	2
Decision making	2
Liability	2
Accident prevention	1
Aerospace	1
AHP	1
Alternative Dispute Resolution	1

Industries / Sectors

Keywords	1999
Construction	2
Aerospace	1
BOT	1
Construction industry	1
Construction projects	1
Development projects	1
FIDIC	1
Hong Kong industries	1
Hydropower	1
Information technology	1

Tools & Techniques

Keywords	1999
AHP	1
Benefits	1
BPR	1
Business plan	1
Combined Operational Effectiveness and Investment Appraisal	1
Continuous approval methods	1
Cost estimation	1
Data exchange	1
Dynamic programming	1
Efforts estimation	1

Countries / Regions

Keywords	1999
China	1
Hong Kong industries	1
Saudi Arabia	1
The Persian Gulf	1

2000

164 Total keywords
133 keywords
41 Papers

The top ten occuring keywords in each category are as follows:

Keywords

Keywords	2000
Project Management	9
Construction	5
Contract	3
Culture	3
Risk management	3
Body of Knowledge	2
Build-Operate-Transfer (BOT)	2
Competitive bidding	2
Conflict	2
Construction Industry	2
Investment appraisal	2

Tools & Techniques

Keywords	2000
Risk management	3
Investment appraisal	2
Risk	2
Scheduling	2
Simulation	2
Cash flow	1
CASPAR	1
Change management	1
Comparative analysis	1
Computation approach	1

Industries / Sectors

Keywords	2000
Construction	5
Collaboration	1
Collaborative working	1
Construction Industry in Jordan	1
Construction Management	1
Government initiatives	1
Health	1
Industrial projects	1
International	1
Joint Venture	1

Countries /Regions

Keywords	2000
China	1
Construction Industry in Jordan	1
Developing countries	1
Hong Kong	1
International	1
Saudi Arabia	1

2001

177 Total keywords
152 keywords
43 Papers

The top ten occuring keywords in each category are as follows:

Keywords

Keywords	2001
Project Management	8
Construction	4
Risk management	4
Analytical Hierarchy Process (AHP)	2
Information Systems	2
PERT	2
Project risk management	2
Project selection	2
Risk	2
Risk analysis	2
Risk assessment	2

Tools & Techniques

Keywords	2001
Risk management	4
Analytical Hierarchy Process (AHP)	2
PERT	2
Project risk management	2
Risk	2
Risk analysis	2
Risk assessment	2
Risk identification	2
ANP and ZOGP	1
Benchmarking	1

Industries / Sectors

Keywords	2001
Construction	4
BOT-type schemes	1
Concurrent Engineering	1
Healthcare	1
Information System Project	1
Infrastructure projects	1
International projects	1
Joint Venture projects with foreign cooperation	1
Large-projects	1
Large-scale projects	1

Countries /Regions

Keywords	2001
Saudi Arabia	2
Hong Kong	1
India	1
Malaysia	1

2002

290 Total keywords
243 keywords
67 Papers

The top ten occuring keywords in each category are as follows:

Keywords

Keywords	2002
Project Management	13
Managing projects	5
Time	4
Value management	4
Cost	3
Change	2
Construction	2
Construction Management	2
Critical chain	2
Design-build	2
Distributed operations	2

Tools & Techniques

Keywords	2002
Value management	4
Critical chain	2
Project risk management	2
Project success criteria	2
Resource allocation	2
Resource scheduling	2
Risk management	2
Theory of Constraints	2
AHP	1
Cash flows	1

Industries / Sectors

Keywords	2002
Construction	2
Construction Management	2
Design-build	2
International projects	2
Concurrent Engineering	1
Construction in Jordan	1
Design-bid-build	1
Develop and construct	1
Electricity markets	1
EPC projects	1

Countries /Regions

Keywords	2002
Hong Kong	2
Construction in Jordan	1
India	1
Japan	1
Russia	1
Saudi Arabia	1
UK	1

2003

292 Total keywords
239 keywords
66 Papers

The top ten occuring keywords in each category are as follows:

Keywords

Keywords	2003
Managing projects	10
Project Management	9
Knowledge management	5
Uncertainty	4
Construction	3
International projects	3
Managing and leading	3
Agency	2
Benchmarking	2
Competence	2
Contracting strategies	2
Cooperation	2

Tools & Techniques

Keywords	2003
Knowledge management	5
Uncertainty	4
Benchmarking	2
CPM	2
Culture	2
Implementing strategy	2
Knowledge sharing	2
Programme Management	2
Project portfolio management	2
Risk management	2

Industries / Sectors

Keywords	2003
Construction	3
International projects	3
Aerospace	1
Aerospace industry	1
Complex projects	1
Concurrent Engineering	1
Construction Industry	1
Construction projects	1
Environment	1
Groundwater projects	1

Countries /Regions

Keywords	2003
Hong Kong	2
Developing countries	1
Ghana	1
Japan	1
Saudi Arabia	1

2004

301 Total keywords
241 keywords
67 Papers

The top ten occuring keywords in each category are as follows:

Keywords

Keywords	2004
Project Management	11
Managing projects	10
Risk management	4
Teams	4
China	3
Construction	3
Innovation	3
Managing and leading	3
Processes	3
Procurement	3
Competence	2
Construction Industry	2

Tools & Techniques

Keywords	2004
Processes	3
Procurement	3
Factor analysis	2
Fuzzy sets theory	2
Project Planning	2
Project research	2
Balanced scorecard	1
Bar chart	1
Benchmarking	1
Bid evaluation	1

Industries / Sectors

Keywords	2004
Construction	3
Construction Industry	2
Joint Venture	2
Partnering	2
Partnerships	2
Project research	2
Building design	1
Concurrent Engineering	1
Engineering	1
Engineering construction	1

Countries /Regions

Keywords	2004
China	3
Africa	1
Chinese construction industry	1
Queensland	1
Vietnam	1

2005

295 Total keywords
238 keywords
70 Papers

The top ten occuring keywords in each category are as follows:

Keywords

Keywords	2005
Project Management	9
Cost	7
Managing projects	7
Time	6
Risk	4
Design-build	3
Information technology	3
Managing programmes	3
Stakeholders	3
Success and strategy	3
Value	3

Tools & Techniques

Keywords	2005
Risk	4
Cash flow management	2
Change	2
Project Planning	2
Simulation	2
Analytical Hierarchy Process (AHP)	1
Cash flow forecasting	1
Chance-constrained programming	1
Claims	1
Concordance analysis	1

Industries / Sectors

Keywords	2005
Information technology	3
Construction	2
Alliances	1
Complex projects	1
Construction Management	1
Construction management agency and construction management at risk	1
Design-bid-build	1
Development projects	1
Environmental	1
Highway construction	1

Countries /Regions

Keywords	2005
Africa	1
Taiwan	1

2006

323 Total keywords
258 keywords
72 Papers

The top ten occuring keywords in each category are as follows:

Keywords

Keywords	2006
Managing projects	17
Project Management	7
Implementing strategy	5
Risk management	4
Construction Industry	3
Procurement	3
Public Private Partnerships	3
Systems approach	3
Teams	3
Alliances	2
Bodies of knowledge	2
Change	2

Tools & Techniques

Keywords	2006
Implementing strategy	5
Discounting	2
Earned Value	2
Investment appraisal	2
Knowledge management	2
Project risk management	2
Uncertainty management	2
Analytical Hierarchy Process (AHP)	1
Annuity Model	1
Bar charts	1

Industries / Sectors

Keywords	2006
Construction Industry	3
Public Private Partnerships	3
Information technology	2
International projects	2
Public work contract	2
Public-Private Partnerships	2
Automation	1
Build-Lease-Transfer (BLT)	1
Build-Operate-Transfer (BOT)	1
Business projects	1

Countries /Regions

Keywords	2006
India	2
Australia	1
Denmark	1
Germany	1
Hong Kong	1
Indonesia	1
Japan	1
Saudi Arabia	1
Taiwan	1
United Kingdom	1

2007

380 Total keywords
315 keywords
85 Papers

The top ten occuring keywords in each category are as follows:

Keywords

Keywords	2007
Project Management	12
Construction Industry	8
Managing projects	7
Strategy	5
Competence	4
Risk management	4
Construction	3
Decision making	3
Information technology	3
Partnering	3
Alliances	2

Tools & Techniques

Keywords	2007
Decision making	3
Benchmarking	2
Fuzzy logic	2
Risk allocation	2
Simulation	2
Value and benefit	2
Value management	2
Analytic hierarchy process	1
Analytical Hierarchy Process (AHP)	1
ANP	1

Industries / Sectors

Keywords	2007
Construction Industry	8
Construction	3
Information technology	3
Partnering	3
Alliancing	1
Concession contracts	1
Development projects	1
Education	1
Infrastructure	1
Joint Ventures	1

Countries /Regions

Keywords	2007
China	1
Egypt	1
Malaysia	1
Thailand	1

2008

379 Total keywords
317 keywords
86 Papers

The top ten occuring keywords in each category are as follows:

Keywords

Keywords	2008
Managing projects	13
Project Management	13
Project success	5
Learning	4
Projects	4
Competence	3
Education	3
Knowledge management	3
Project management education	3
Strategy	3
Complexity	2
Defence	2

Tools & Techniques

Keywords	2008
Project scheduling	2
Resource constraints	2
Uncertainty	2
Value	2
Agency theory	1
Analytical Hierarchy Process (AHP)	1
Analytical Network Process (ANP)	1
Arbitrage pricing theory (APT)	1
Bayesian analysis	1
Benchmarking	1

Industries / Sectors

Keywords	2008
Information technology	2
Mass house building projects (MHBPs)	2
Automotive telematics	1
Build-Operate-Transfer (BOT)	1
Complex development projects	1
Construction	1
Construction claims	1
Construction contracts	1

Countries /Regions

Keywords	2008
Ghana	2
Hong Kong	2
China	1
Jordanian Construction Industry	1
Singapore	1
South Africa	1
Thailand	1
UAE construction industry	1

2009

355 Total keywords
311 keywords
80 Papers

The top ten occuring keywords in each category are as follows:

Keywords

Keywords	2009
Project Management	20
Construction	4
Construction Industry	3
Information technology	3
Managing projects	3
Scheduling	3
Claims	2
Construction projects	2
Contractor selection	2
Cooperation	2
Innovation	2

Tools & Techniques

Keywords	2009
Scheduling	3
4D construction management	1
Bayesian belief networks	1
Cash-flow controlling	1
Cash-flow planning	1
Clustering techniques	1
Commitment matrix	1
Comparative analysis	1
Cost control	1
Cost estimating	1

Industries / Sectors

Keywords	2009
Construction Industry	3
Information technology	3
Construction projects	2
Automotive industry	1
Build Operate Transfer (BOT)	1
Concurrent Engineering	1
Constriction project	1
Department of defense	1
E Government	1
Major Projects	1

Countries /Regions

Keywords	2009
Zambia	2
China	1
Dubai	1
Hong Kong	1
Iran	1
Mashhad	1
United Arab Emirates (UAE)	1
Vietnam	1

2010

363 Total keywords
306 keywords
80 Papers

The top ten occuring keywords in each category are as follows:

Keywords

	2010
Change	6
Communication	6
Project	5
Change Management	3
Construction	3
Programme management	3
Project business	3
Project portfolio management	3
Project success	3
Contractor selection	2

Tools & Techniques

	2010
Project scheduling	11
Experimental design & analysis	2
Project screening criteria and evaluation	2
Benchmarking	1
Concurrent engineering	1
Data envelopment analysis	1
Delay analysis	1
Dialectics	1
Discrete choice models	1
Empirical evaluation	1

Industries / Sectors

	2010
Construction	8
Public-Private-Partnerships (PPP)	4
R&D projects	2
Water Supply	2
Auto industry	1
Biotechnology	1
Construction Management	1
Electrical vehicle	1
Mega-projects	1
Pharmaceutical project	1

Countries / Regions

	2010
China	2
France	1
Indonesia	1
Kenya	1
South Africa	1
Thailand	1
The Netherlands	1
UK	1