

RESULTS ANALYSIS AND DISCUSSION

4.1 Stage 1 – Questionnaire

This section will be used to discuss the results of the statistical analysis. For this research the author has performed the analysis with project managers that are involved in the construction industry or performed construction projects, throughout Australia.

4.1.1 Respondents' Background

Even though all the respondents are selected from project managers that are involved in the construction industry or have been involved in the construction projects, it is noted that the respondents may be from different background sectors. Most of the respondents are from Construction sectors (52%). The rest of the project managers are from the Utility (15%), Government (13%), Project Management (10%) and Engineering (10%) sector.

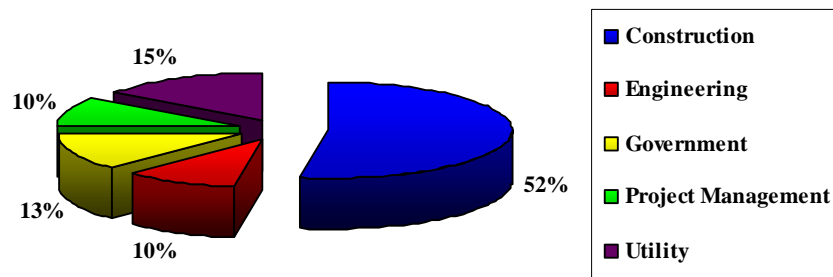


Figure 4.1: Project Managers from Different Sectors

The questionnaires were sent equally or evenly to all the project manager from the different sectors in the construction industry or are involved in the construction projects. This shows that most of the project managers involved in projects that are construction industry are still mostly based in the construction sector.

From the 40 questionnaires received, 59% of the total respondents have project management of 5 years or less, 18% have experience of 16 years or more, 13% of them have experience between 6 to 10 years, and the least at 10% for experience between 11 to 15 years.

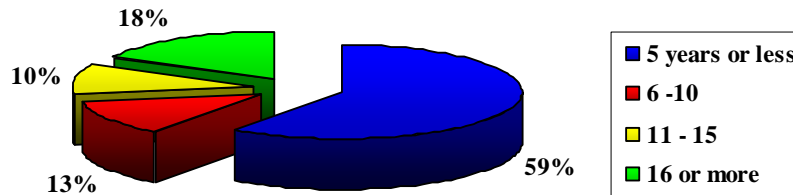


Figure 4.2: Years of Project Management Experience

4.1.2 Risk Management Usage

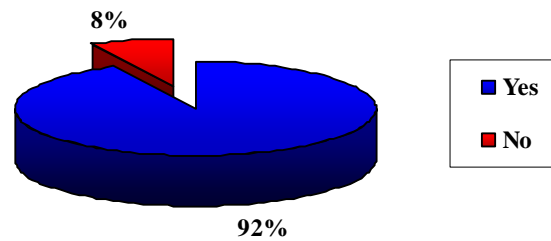


Figure 4.3: Provision of Risk Management

From the 40 questionnaires that were received, 8% of the respondents' states that they or their organisation do not provide Risk Management, and all 8% of them are in the category of having project management experience of 5 years or less. Some respondents states that even if they or their organisations provide Risk Management, it would be an informal process, depending on the comparison and outcome of their company risk assessment chart, whether that particular project needs Risk Management or not.

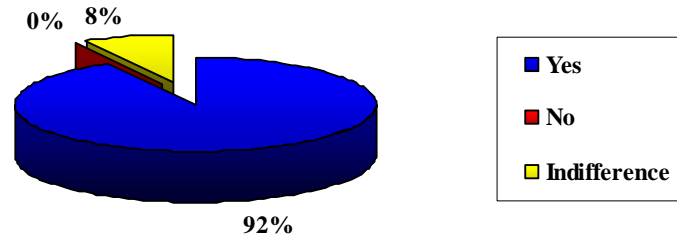


Figure 4.4: Risk Management Usefulness and Effectiveness

Out of the 37 respondents that uses Risk Management, 92% finds Risk Management useful and effective, while no one finds its not useful or effective, 8% are impartial to it. 67% of the respondents that are impartial to the usefulness or effectiveness of Risk Management has project management experience of 5 years or less. While the remaining 33% has project management experience of 16 years or more. A few respondents that find Risk Management useful and effective commented that it is not all the time true, but it is applicable in most cases.

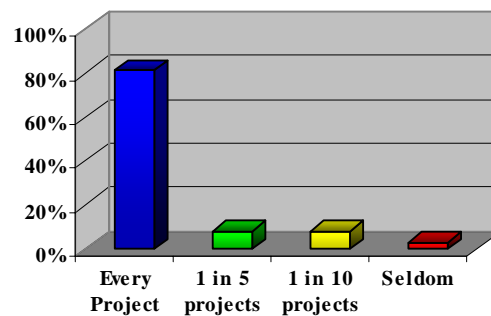


Figure 4.5: Frequency of Risk Management Usage

81% of the respondents that uses Risk Management use it in every project. A fair balance of 8% the respondents uses it every 1 in 5 projects, or 1 in 10 projects. Only a small scale of 3%, seldom use Risk Management in their projects. A number of respondents state that quite often it is not every project they would use Risk Management in their project, but almost every project in the ratio closer to 1 in 2 projects.

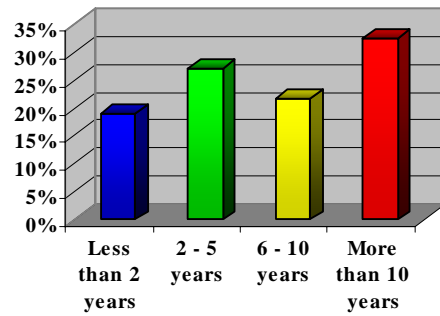


Figure 4.6: Length of Risk Management Provision

There seems to be an even distribute on the number of years Risk Management are provided by the respondents or from their organisations. 32% of the respondents have provided Risk Management for more than 10 years, while 22% provided for 6 to 10 years, 27% for 2 to 5 years and 19% for less than 2 years.

YEARS OF PROVISION	FREQUENCY OF RMGT PROVISION			
	EVERY PROJECT	1 in 5	1 in 10	Seldom
Less than 2 years	14%	3%	3%	0%
2 - 5 years	19%	0%	5%	3%
6 - 10 year	22%	0%	0%	0%
More than 10 years	27%	5%	0%	0%

Table 4.1: Length of Provision against Frequency of Risk Management provision

The largest percentage of 27% of the respondents, who provide Risk Management for more than 10 years, would provide for Risk Management for every project, follow by a slight decrease of 3% to 5% at each category, in years provision against frequency of Risk Management provision. Only a total of 19% falls in the remaining category of providing it in 1 in 5 projects, 1 in 10 projects or seldom provided, for all years of provision.

YEARS OF PROVISION	YEARS OF PMGT EXPERIENCE				
	NONE	< 5	6 to 10	11 to 15	16 >
Less than 2 years	8%	23%	0%	3%	3%
2 - 5 years	0%	13%	5%	3%	0%
6 - 10 year	0%	10%	0%	3%	5%
More than 10 years	0%	13%	5%	3%	8%

Table 4.2: Length of Provision against Project Management Experience

For the 8% of project managers that do not use Risk Management, their organisation has provided this service for 2 years or less. As for the 23% of the respondents who have project management experience for less than 5 years, it is possible that their organisations have provided Risk Management services for 6 years or more, and 5% for project managers with experience in between 6 to 10 years for their organisations to have used Risk Management for more than 10 years.

From this analysis and the results shown above, this indicates that Risk Management have been around for many years and project managers from the construction industry or are involved in construction projects, has found it useful and effective, and has continue to use Risk Management for every project they are involved. It is shown that organisation's of respondents that has project management experience of 5 years or less, has used or provided Risk Management for 6 years or more.

4.1.3 Risk Management Benefits

REASONS	
Long term cost savings	58%
Complex projects	50%
Quick and more competent in handling risks	45%
Clients Requirements	30%

Table 4.3: Reasons for Providing Risk Management

This question was put forward to see what the reasons are or benefits to why respondents provides Risk Management. It is found that long terms cost savings is the most apparent reason, and the others being that when the project is complex, for some projects are high risk and cannot commence without a good Risk Management plan; or

that it is required by the client. It also used because Risk Management is a technique or process that quickens and provides more competencies in handling risk.

Quite a handful of respondents, 15%, mentioned that the reason of providing Risk Management is also to have early recognition and planning for risks. They have commented that it assists in identifying, verifying and highlighting issues and risk factors early in project life cycle, such as the scope definition stage or before execution of the project. This is therefore to better manage expectations, project outcomes or possible risks, and reducing the chance of the risks from occurring. It is also commented that when Risk Management is provided during the early stages of the project, it will provide client education and assist project sponsors in their decision making.

The other main reason is due to requirement purposes, such as political requirements or impacts especially in government projects; safety e.g. workers; statutory and as above, client's requirements, or simply because it is a standard project execution method. One respondent even commented that the reasons he does not provide Risk Management at every project because it is a formal process and would only use it when requested. Yet, other than being required by the client, the respondents also mentioned that it is also a basic service to their client for it is expected of their job and it is a fundamental to project management. Respondents states that they are just providing good management service, and the company also holds an interest in the project. Achieving project margin and managing public liability are also a few other reasons to providing Risk Management.

4.1.4 Risk Management Deterrents

FACTORS	NOT	2	3	4	STRONG
Too complicated	38%	32%	16%	14%	0%
Time consuming	24%	22%	19%	30%	5%
Not enough information	16%	22%	32%	22%	8%
Not required	27%	18%	18%	18%	18%

Table 4.4: Deterring Factors Affecting Provision of Risk Management

This question was put forward to see what was the reasons that deterred practitioners from applying Risk Management on some or all their projects. Previously from other research done regarding this topic, as discussed in Chapter 2, that Risk Management is time consuming and from the results in the table above, it is shown that there is still a 35% that indicates that time consuming is still the main reason for the short of use but a total of 46% indicates it may be approaching into a non-deterrent factor.

Other deterrent reasons listed by respondents were that their organisations or company does not have enough experience in Risk Management, and there was no strict company procedures therefore relies on individual commitment whether to provide the service or not. Quite often is it difficult to engage staffs especially senior staffs to in providing Risk Management for they are fixed in their old ways to doing things.

It is also listed that political interference, affect from professional indemnity insurance and insufficient resources could deter project managers from providing Risk Management.

The process being too complicated, marked by a distinct 70% definitely shows that this deterrent factor is not present anymore. Risk Management being not or least deterrent because is not required has a total of 45%, but has a constant 18% throughout the scale of it being a slight deterrent to a strong deterrent. One of the respondent commented that there should not be any reasons to deter a practitioner from providing Risk Management when various forms of Risk Management and control measures are used on all projects.

Not having enough information is seen as neither a deterrent factor or that it is not a deterrent factor, with its majority percentage being in the middle of the scale and the least of its percentages in both end of the scale.

4.1.5 Risk Management Life Cycle

Early cost advice is encouraged in order to save time and money, and help maximises quality of work. This is also emphasised by researcher, as discussed in Chapter 2.

Conceptual	Preliminary Design	Detail Design	Tendering	Construction	Operation of Building
27%	23%	18%	14%	13%	4%

Table 4.5: Stages of Risk Management Implementation in Practice Now

From the results from the table, in practice now, Risk Management is launch mainly during the Conceptual stage follow up by the Preliminary Design stage. If following the rules that as long as Risk Management is implemented before Detail Design stage, it should still be beneficial, for any changes made after this stage, not only can it complicate the plan but also definitely can be very costly. Again, respondents did mention this point, commenting that Risk Management is not only on-goingly checked throughout the project, but should all be done as early as possible in the project life cycle, for later stages will cause extra costs.

When ask which other stages of Risk Management should be provided than the practitioner's usual practice, a result was tabulate in the table below.

Conceptual	Preliminary Design	Detail Design	Tendering	Construction	Operation of Building
32%	14%	12%	18%	14%	10%

Table 4.6: Stages of Risk Management Implementation Preferred

There is a distinct choice from the respondents on the Conceptual stage, as some respondents refer it to as the Business Plan stage or Feasibility stage, which is the ideal recommended stage by most learned researchers of this topic or subject area, as discussed in Chapter 2. There is an even spread of the results at the remaining stages, showing that the respondents feel that Risk Management should be provided or

maintained throughout the whole process. Overall respondents' comments mentioned that there should be Risk Management but for it to be effective, it needs to be initiated in the conceptual stage.

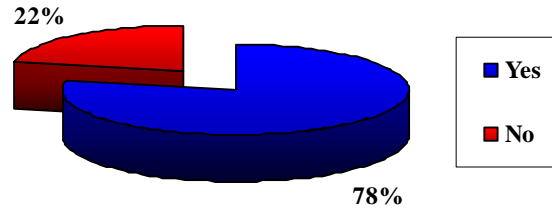


Figure 4.7: Maintenance of Risk Management

A 78% of respondents do follow up or maintain Risk Management throughout the project life cycle, yet there is still 22% that do not. Researchers has emphasised that not only Risk Management should be launched at the early stage of a project life cycle, but also in order for it to maximise the benefits, it should be maintained and constantly have follow ups throughout the whole project life cycle. One respondents states that he tries to maintain it but time restraints plays a part in restricting constant follow ups, and if Risk Management is maintained, it is only in some areas only.

4.1.6 Risk Management in Conceptual Stage

PROBLEMS	
Unforeseen disputes and claims	60%
Project time slippage	60%
Excessive variations	55%
Less likely to find alternative solutions	43%
Unable to identify cost savings	40%

Table 4.7: Problems Encountered when Risk Management Not Implemented During Conceptual Stage

This question was put forward to define the problems that exist when Risk Management is not implemented during the Conceptual stage. The top two problems were there would be unforeseen disputes and claims, and project time slippage, follow up by excessive variations. Disputes, claims and variation are more costly to fix at a

later stage of the project. If Risk Management is not implemented early in the project life cycle stage, it is unlikely to find good alternative solutions later during the project life cycle stage when risks are encountered, and chances of encountering unidentified obstacles will increase and inability to identify cost savings.

Generally it is stated by the respondents that they are unable to get a fine perspective of the project and likeliness of success if Risk Management is not implemented during the Conceptual stage for if the Risk Management plan is ill considered at this stage, there would be cost pressure or cost overruns later in the project. If this occurs, client may see it as a lack of management ability on behalf of the consultant. There would be political embarrassment especially for government projects.

Therefore not implementing Risk Managements during Conceptual stage has shown that there are many problems encountered, especially during the later stage, which are more costly or financially implicated. Therefore the next question is brought up to find out the extend that will encourage practitioners to implement Risk Management, especially during the earlier stage of the project life cycle.

FACTORS	LITTLE	2	3	4	LOT
More training	5%	3%	41%	22%	30%
Emphasis benefits of usage	5%	5%	30%	22%	38%
Better or cheaper provision of tools and techniques	9%	12%	32%	21%	26%

Table 4.8: Factors for Implementing Risk Management

Majority of the respondents feels that an emphasis on the benefits of Risk Management usage, such as that it is a proven risk preventive measure, especially to client, is the best reasons to encourage the implementation of Risk Management for Risk Management is often seen as a “Soft Element” of project management. The next factors would be providing more training, such as Risk Management workshop, and if there are ‘better or cheaper’ provision of Risk Management tools and techniques. A respondent commented that education is a good tool, yet another respondent also commented that the Risk Management industry does not need more ‘toys’ when referring to bracketing the word ‘tools and techniques’.

The next common factor would be implementing or incorporating as a requirement, into project documentation, regular reporting, policy and procedure in the company or organisation, quality systems and KPI, such as government regulations and client's requirements.

Previously it has stated that one of the reasons that deter Risk Management usage is because it is time consuming; therefore making it more time available as suggested by the respondents, by keeping things simple and with proper upfront planning would change the perspective on its usage and turning it to a useful risk preventive process.

Another previous deterrent stated was there was no or little commitment from organisation or companies to implement Risk Management therefore a respondent mentioned that keeping an active management commitment, such as providing Risk Management workshop should also maximise the reason for implementing Risk Management.

4.1.7 Risk Management Advantages and Disadvantages

Since there were still problems existing that may be the reasons encumbering the use of Risk Management in the industry, therefore the author put forward the next questions to find out the weight of advantages versus disadvantages of Risk Management.

ADVANTAGES		DISADVANTAGES	
Minimises risk	90%	Time consuming	58%
Minimises claims and disputes	68%	Unforeseen Risk	30%
Long term cost savings	63%	Consume more resources to conduct	8%
Quality improvement	63%	NONE	13%
Quick risk response	58%		
Solutions alternatives	55%		

Table 4.9: Advantages and Disadvantages of Risk Management

From the survey, it is found that the advantages seems to have a higher percentage then the disadvantages, with the main advantage that Risk Management minimises risk, or unforeseen circumstances later in the project, if it was implemented by the practitioner

in their projects. There is nearly an even spread for the remaining advantages that was listed by the author. The surprising finding was that no respondents list any other advantages found in this process, and one respondent mentioned that the benefit of Risk Management to be able to minimise claims and disputes will only arise if there was a clear project baseline and management to it, and not from the Risk Management process itself.

The percentage of disadvantages of Risk Management seems to be lower than the advantages, yet the practitioners have listed many other disadvantages that are present when using Risk Management. The disadvantages listed were that Risk Management process can be subjective and that there was an over dependence on a simplify exercise in dealing with potentially extremely complex and uncontrollable variables, for some practitioners finds that Risk Management involve many uncontrollable variables.

One other common observe disadvantage is that sometimes the higher management on the project do not share the information of the risk plan with the employees or junior project managers of the organisation or company, therefore the junior practitioners are not aware of any potential hazards existing in their project when it is being pass on or hand over to them during implementation or construction stage. At times the plan is there but nobody seems to be interested in implementing it or enforcing the junior practitioners to maintain or follow it up.

One other respondent mentioned that Risk Management keeps getting caught by new events and sometimes it is costly and there seems to be even lack of resources to implement Risk Management. The worse outcome could be the results obtain from Risk Management report at the early stages, gives misleading unforeseen risks or decisions to overcome them. This leads to a problem on top of a problem – double jeopardy, twice the headache and twice the costs.

Yet 13% of the respondents states clearly that they do not find disadvantages in Risk Management, only advantages, and that it would be a disadvantage if Risk Management is not used on a project and suffering from the consequences later. One states that *'failing to plan is planning to fail'*. Even with disadvantages present while using Risk Management, at the end of the day, it is still *'well worth it'*.

4.1.8 Risk Management Tools and Techniques

TOOLS & TECHNIQUES	Comparison w/ others	Frequency of usage
Brainstorming sessions	28%	75%
Checklist	25%	68%
Sensitivity Analysis	13%	35%
Decision trees	12%	33%
Influence diagrams	5%	13%
Monte Carlo Simulation	3%	8%
Pass experiences	3%	8%
Risk Matrix	2%	5%

Table 4.10: Risk Management Tools and Techniques

A tool or technique is a key to any process, as discussed in Chapter 2. Therefore the final question to this survey is put forward to see which risk analysis or management techniques were commonly used by practitioners to tackle Risk Management.

Brainstorming sessions and checklist was shown to be the most common tool or techniques used, compared to other methods, and from the analysis table above, they are also very frequently used. Even though they are only basic tools or techniques, compared to other tools available, it has twice as much usage. From the previous analysis on previous question, practitioner has state that *'keeping it simple'* would encourage the usage or implementation of Risk Management, therefore from the above, it is proven that practitioners has sort to using a very basic and simple tool then the many other sophisticated tools that are available. This also reinforces the statement made by a respondent on a previous question that the Risk Management industry does not need more *'toys'*. The point is that there is a need to educate and encourage the usage on current techniques, for example through Risk Management Workshop, and emphasis the benefits of its usage.

Other basic applications are like daily monitoring and reporting throughout the project life cycle or a simple table outlining the category of risk, the risk event, likelihood, impact, containment, monitoring and responsibility, which known to some as the risk matrixes or subjective rating. Some are just as plainly as developing a risk mitigation strategy for prevention and contingency. Basically some organisations or companies

have their own in house software or building code that are used to implement Risk Management.

There are respondents that mentioned that some of the industrial standard studies are actually a form of Risk Management. For example, Hazop (hazardous operation), IPF (instrumentation protective function), and some other exercises are designed to challenge the design in order to identify potential problems and to evaluate possible consequences.

For more complex project, such as construction of oil tanks, the practitioners may sort to a hazard identification plan or HEMP (hazard and effect management plan), where it will identify the types of risks involve during the construction stage of the project and throughout the project life cycle. It is similar to the risk matrix where it has the likelihood and effects scale from 1 to 5.

Some other tools and techniques listed by the respondents are more sophisticated tools other than the Sensitivity analysis, Decision Tree, Influence diagram and Monte Carlo simulation mentioned are the Klepner and Tregoe.

Finally, about 8% of the respondents' states that previous experiences and lessons learned are the main tool to any project managers' needs, in order to implement the best Risk Management.

4.2 Stage 2 – Interview

This section will be used to discuss the transcribed data from interviews. For this research the author has performed the analysis with project managers that are involved in the construction industry or performed construction projects, only in South Australia.

4.2.1 Interviewee's Background

It was previously noted in the first stage of this chapter, respondents may be from different background sectors, therefore to have a balance feedback from each sector of the construction industry, the ratio that was chosen are:

- 2 project managers, from the project management sector, for they are the general project managers that commonly represent the large percentage of professional project managers
- 1 project manager, from the construction sector for they represent the larger scale of most project managers are allocated from
- 1 project manager, from the government sector for it represent the public and political side of the construction industry
- 1 project manager, from consulting team or private sector for they represent the consultant team that works on the project itself and delivering the client's requirements.

3 of the project managers interviewed have at least 11 years of project management or more. This was because the author wants to achieve more grounded findings on the trend of Risk Management. With the 2 remaining project managers, one has experience in the category of 6 – 10 years, while the other one has project management experience of 5 years or less. These project managers are chosen to represent the new thinking and the large scale representation of young practitioners in the industry.

4.2.2 Risk Management Usage

The author was informed that Risk Management has been around since twenty five years ago in one form or another, and the interviewee believes that there were forms of Risk Management around even before then. It has not really been formalised and only came into vogue in the last ten to fifteen years. Some practitioners even mentioned that five years ago Risk Management was still quite informal and about two years ago it became a lot more stringent and it was required for every project and everything they do. Before, it was common that project information was not documented properly or documented loosely, and Risk Management approach was inconsistent, but now there is a need for consistency and to follow proper process.

“Risk Management has happened in the past informally and without people knowing. We practice Risk Management every day of the week.”

A few project managers states that they are pro-active in active Risk Management and it is an integral part of what they do and ‘*would not be without Risk Management*’. One project manager says that Risk Management is applied all the time, pretty much on a day to day basis, either formally or informally, and they use it in one form or another in every project.

It is found that Government projects in particular with large budgets have a much formalised Risk Management and reporting process. For most practitioners, larger projects are more formalised and have procedures and check lists that are used, and to try and identify a variety of risks at the beginning of the project. As the projects scale down in size, so does their system of Risk Management, therefore it is not a formalised process as such.

Smaller organisation use it but not in a formalised sense for practitioners finds that Risk Management is just part of what they do naturally and it is part of their every day work ethics. For they found that if project is not so big, it then can be implemented day by day and are actually more efficient than some larger projects where there are so many parts to the formalised process. The time that it takes to put the concept together for a larger project versus a smaller project is very costly.

It is also found that some construction companies or organisations, especially small ones, do not engage actively in Risk Management. Only the project manager on his personal interest does so, and only in minor Risk Management procedures, which are not integrated into the company-wide systems and processes. It is only implemented internally on their own projects, such as the design or planning stage, by trying to involve and get as much input into the project as possible from the stakeholders involved.

Yet junior practitioners that have project management experience of 5 years or less does not use Risk Management for all projects. It is shown that the information pool out there diminishes. The more students the industry has coming through and the less knowledge that is passed down to them, the greater that risk is.

It is also noted that Risk Management is an integral part of what practitioners do on a sliding scale depending on the project and they believe it is very useful and it is effective provided the clients are prepared to take their advice on board, and that does not always happen. Things that can come out of left field can come from anywhere and project managers need to make their client aware of the process, and where they can come unstuck and what it might do to the timeframe of the project, the impact it might have on the cost and design of the project.

4.2.3 Risk Management Stakeholders

“Call the project manager the risk manager if you wanted to because that’s one of the key jobs that the project manager does.”

All the interviewees agrees that project managers are the ones that initiates Risk Management for it is part of what the project manager has to manage, see happen and develop during the project. They play a very proactive role for project management and are to initiate all the requirements for the project from the 9 PMBOK® areas.

In government projects, fund provider initiates Risk Management as a prioritisation exercise but in large projects, a project manager usually initiates Risk Management formally.

It was brought up that usually there is a need to pick the right stakeholders to be there for the risk assessment and that may change, for the stakeholders may change for different Risk Management workshops at different stages through the project, depending on how the project is set up. The earlier ones might be designers and technical people and not have any construction type people involved, where later ones will have construction people involved as well as the client representatives as well. So the people that get involved in the Risk Management, the type of risks that are looked at tend to change as one goes through the project, so will look at slightly different risks.

In some cases, it is conducted by initiation of the client, to establish if the project is feasible. Some clients have standard project management procedures which they want everyone to follow, which will include Risk Management. Project manager are requested to do the job properly on behalf of the client, and it is then the project manager's initiative. But in some cases the project manager is required to follow internal, corporate procedures that are done. So project managers that work for large corporations will automatically do it as part of a set internal procedure that they have to comply with.

Quite common during the initial stages when introducing new Risk Management procedures clients are initiated, but once all stakeholders have been through the training, clients do not initiate it anymore and they expect project managers to do it for them from then on.

With smaller client, it is found that the advice that they are prepared to take diminishes. Unlike major developers, these clients after they receive the basics, are not as in tune to listening to some of the other ideas that project managers have and some of the other risks that they may face, particularly financial viability for they generally have already made their own decisions in terms of whether they think the project is viable or not. '*Small minded clients*' are not always as receptive to Risk Management as what you might be led to believe, particularly in the smaller projects.

An example quoted from an interview on the above statement:

“A lot of the project manager’s clients are developers that have been working on a regular basis and the clients believe they have a good handle on what the costs are. They believe they have a good understanding of what the community wants in the terms of a project and they look at the bottom line. By bottom line I mean the profitability of a project, and that is why I call them “small minded clients”, is they might be doing a \$2 million project and are not prepared to spend \$2,000 to get someone to come in to look after the cost because that is one of the easiest examples as far as Risk Management goes. Well the biggest example. They are not even prepared to spend that sort of money to guarantee the viability of the project and make sure that they are not going to go over budget and that it will come in within the dollars that they are looking at.”

Some clients do not like to see extra cost because they do not think it justifies for it. They like the idea of Risk Management but they do not understand the implications, and they think they can better use their time doing other things. Therefore it depends on how risk aware clients are. If clients do not care about risk or they are in a low risk environment, they do not want Risk Management and do not want to pay for it. If client are from large public sector organisation, they are more risk adverse and very risk aware, then it is mandatory and are more willing to pay for Risk Management, e.g., \$10,000 now might save them a million dollars later. They realise it is a low price to pay.

“The clients act a little like ostriches with their heads in the sand. They don’t want to know about any risk because they know it will cost them money.”

Alternatively, many clients are the ones who want Risk Management done and they do fund the Risk Management during planning stage, but not for conceptual stage or during the project for maintenance. This is more apparent at small business clients, which are mostly the main stream clients, for they might run their business in a very easy going way or they are not used to doing Risk Management. When project manager are engaged by clients that are not used to accepting risks, they have to make the assessment whether to do the process at their own cost and manage the project

accordingly, or convincing the client do the Risk Management with them, except it is commented by the same project manager, that doing Risk Management without the client's acceptance is not really the right option.

Two project managers interviewed say that they can usually convince clients to use Risk Management and it is not too difficult these days to convince clients because most clients will want it. Particularly larger businesses where they are now used to having Risk Management procedures happening in their business context, and clients go through Risk Management processes on a regular basis looking at the direction their business is taking, such as the risks their businesses are taking and their exposure to the market in which they work. To these project managers, clients these days, in the main, are used to doing Risk Management processes in relation to their business. Therefore it is not something unusual for them to do it in relation to specific projects within the business.

“Clients are rapidly becoming more, not educated, but more understanding of Risk Management.”

It is said a few years ago a lot of clients are still becoming educated on Risk Management. But today clients expect Risk Management to happen. Project Managers working on larger project are expected to use formalised Risk Management procedures. Client in government department, use formalised Risk Management sessions in place for they are accountable and have a responsibility to public domain. There are definite Risk Management sessions where the whole team are brought in together. While for smaller projects it is not a formalised process, it is a matter of leading the clients and is just part of the process that project managers naturally do. It is integral part of what they do, and each stage along the way they examine different aspects of the project in terms of its risks.

“Informal process are very similar, they were not what we have today, which is Australian Standards and those sorts of things, but a process.”

Most organisations now have standard procedures and processes usually based on the Australian Standards, than ad-hoc or individuals who did their own procedures. So

they did Risk Management but not conforming to a common standard. It was the standard in the PMBOK® that brought it together and then it appeared, not only in Australia but also internationally.

4.2.4 Risk Management Process

Project managers operate on behalf of the client. They get involved in doing feasibility studies for the client where part of that process will be looking at the options, the feasibility, the benefit cost analysis and the financial or economic analysis on the options. Risk Management will be a key part of that *'optioneering process'*.

Practitioners begins where they manage risk by putting down what they are going to do in writing and qualifying the limitations. It is up to the client to determine the level of risk that he wants to take. When it is a matter of determining which ones, usually the risks taken are going to be on the extreme, high or probably medium as well. Next, there would be a need to go through a risk strategy and looking at the things and deciding what going to be done. They will then focus and make out a solution for it or provide alternative options. Practitioners will then approach mitigation or negotiation, and risk sharing. Finally, there are just risks that have to be taken hit on.

“Avoidance is the preferred method of Risk Management. Smart thinking to result in removal of a risk with little or no cost.”

Having put a strategy in place, project managers got to make sure that they have got someone who will be responsible for it. According to one of the project manager interviewed, this may sound extreme but if they do this, it can reduce some risks from being extreme risk to a lower risk and it has to be checked through regular project processes. Risks are not necessarily constant, for risks can appear halfway through the project. There is a need to keep on reassessing and re-evaluate the risks to make sure that that strategy was effective and whether there are any new risks, in order to achieve a successful project outcome. This is why Risk Management is important right throughout the project lifecycle.

Project managers keep a 'status report' which monitors if there are any changes in the project which requires attention before it gets out of hand and become a risk. The report monitors budget, expected completion and progress. It is circulated to the stakeholders where they are asked to think about it and if anything risks come up for the duration of the project to inform the project managers, "*but 9 times out of 10 they will never look at it again until something goes wrong*" but as project managers; they try to review the document as deemed necessary and see how things are going. If things are going well they do not tend to frustrate the risks but if things are starting to get sticky then they start to look at some of the risks and some of the mitigation strategies that was thought about in the brainstorming session, just to see where the risk might be coming up.

For small projects, project managers might do a semi formal risk assessment where via email and documented it in an office spreadsheet, follow up by a report and then circulate it. There should be a document for every project, and it is monitored and controlled and reviewed regularly for every project. Any lessons learnt from the Risk Management side of things, it is passed onto the next project like any formal close out and lessons learnt for any project.

"Now you might not call it a formal Risk Management process but either the formal or the informal process you're going to go through is still a Risk Management process."

At the end of our projects practitioners would actually go back and review using the "*Post Occupancy Review*". So after the client had actually occupied the building project managers would actually go back, sit down with the client, review what his original brief was, see how successfully that brief was addressed and take on board issues that should be addressed in future projects. So some project managers interviewed actually had a "*Post Occupancy Review Phase*" where at the end of the project the whole project was reviewed right down to client satisfaction in terms of how the brief was resolved, how the building is functioning and what they would do differently if they project were to happen again. There is a much formalised recording process for all of that.

After handing over of project, project managers hopes it meets client's satisfaction but if it does not work properly or there is a technical hitch, there will be a need to look at what is happening and whether to recognise it as a risk process or not, by looking at what is the cause of the problem, and how to fix the problem.

“So you may not call it a Risk Management exercise after completion but you get a fault or something, you will look at it. Risk is a problem, a fault's a problem.”

This, which in itself is a risk process.

4.2.5 Risk Management Tools and Techniques

One of the method used by the project managers interviewed are checklists. Mainly qualitative ones are used, and not quantitative. Quantitative, like the statistical analysis gets involved in the financial or economic analysis part of the risk assessment process in the planning stage, but for the other risks it is mainly brain storming, qualitative.

Basically, project managers and the stakeholders brainstorm what the ideas are and then score them and determine if they are low, medium or high. The client might have something more complicated, but project managers normally try to keep it simple – *“the old KISS principle”*. There are many types of Risk Management tools and techniques out there, and it does not have to be a full on box rating system. It can be as simple as a live spreadsheet that gets updated every month with current project progress for the project manager to know if anything is going to get blown up. Very commonly practitioners only use Excel or risk matrixes. A statement from the interview on the previous statement:

“If we have a likelihood of 0 – 5, then we get everyone in the room to agree what the likelihood to be, and then if we have an impact from 0 -5, which we do and then get every one to agree what the impact would be, then it's that times that (likelihood vs. impact) to give you the total risk (rating). Which is simple.”

Brainstorming or risk storming is going through identifying the risks, assessing the likelihood and the impact and then coming up with the management strategies, and is usually done by the stakeholders that were involved in Risk Management workshops. Then the information is distributed to others, usually as part of an assessment, particularly at the optioneering stage. The information derived from that will then form a part of the recommendations as to which option clients and project managers going to adopt to solve the problem. If it was something that had not been addressed or was missed then the same process would take place. There would be a review meeting. So it is a management structured meeting as opposed to software programs.

Stakeholders will all get copies of what were developed. By giving them a copy reminds them of what their contribution was and could also remind them to think of anything new risks that are not thought of previously, or of any new mitigation or avoidance strategy. This document can serve as a means to jog everyone's memory. Many practitioners finds that there is a major issue in the organisation '*as mistake often ARE repeated*' for checklist is only with the top managing staff or senior practitioners due to only 'one way' meetings and reporting on project progression. Therefore most junior practitioners rely a lot on in-field experience - "*it is inefficient, adversarial, but somehow, it work*". Quite often, in the organisation, there is no accredited quality management system which talks about Risk Management or even a basic procedure, for everyone to follow.

4.2.5.1 Risk Management Workshop

Project managers are mostly responsible for workshops and workshops tend to happen quite a bit in government projects, particularly State Government projects. Government projects is very clear cut and a much defined process based on dollar values generally, and they have a process where they determine whether it is a high risk project or not based on dollars. So if it is a high risk project or high dollar project they have a definite path that they follow in terms of reviews and reporting. Yet most young practitioners have only heard off and not attended any.

"It's always a good way of getting stakeholders involved in to the project."

Practitioners usually get stakeholders along, get them to brainstorm some risks and find ways to mitigate some of these risks. Workshops is done more formally so that the client can see they have their own requirement and project managers have to meet their requirements. If clients do not have any requirement project managers suggest something to their budget or time availability, and make it formal by documenting it and handing it over. Different types of stakeholders have different perceptions of the risks and that comes up during risk workshops when actually scoring risks. All are written down according to a risk profile. This is so because, as taken from the interview:

“Somebody who works out in the field who deals with that risk on a day to day basis might say it is a low risk and it is a low likelihood and it has a low impact, but someone who works in the office and doesn’t work in the field might say that is really dangerous and it might happen at any time. When it does happen it might be catastrophic and you will have to entertain the gambit of the whole range of score you might get as part of the process, but like all human beings we suffer from poor memory and we all do not learn the lessons we should and even more importantly there is some intergenerational amnesia. Lessons we learn in this generation are not passed onto the next.”

Even if it is informal project manager might do it via email, instead of getting people out for many hours which can cost quite a lot of money, the project manager and stakeholders can still be able to talk to each other by email and get together to think of some risks and get documented by email. That is still a documented system.

“When you have clients, you have to document risks and protect yourself at the end of the day, so Risk Management is a very important tool.”

One project manager thinks that Risk Management workshop is only a buzzword for the majority of the clients and that the only people who really take it seriously are the insurance people, project managers and some clients ‘*who have a lot to loose*’. Clients do not see its importance and they rather spend their time doing something else.

“I provide Risk Management so I don’t lose my house. When it comes to the court of law and you are being sued, you can show that you have taken all reasonable steps to mitigate risk, control risk, and avoid risk and that you have done your due diligence and that is a defence. And you’re being sued because you have not done one of those things and one of those things went wrong and you’ve got no defence except stupidity.”

4.2.6 Risk Management Benefits and Deterrents

“One Risk Management a day to keep the auditors away”

Benefits of Risk Management pinpointed in most interviews are listed below:

- Project manager sees it as a management tool. It allows for identification of risks easily and also better cost-analysis, as well as identification of areas that can ‘burn your budget’.
- Done to establish risk exposure and later risks mitigation or avoidance.
- Potential to save clients some costs especially unforeseen costs that may be very costly or has a very large financial impact.
- Project managers get to engage the stakeholders into the project.
- Able to give client as much information as possible to determine the viability of the project and whether it will achieve his actual goals.
- Gives assistance in determining which option to adopt. When there are a number of options available, by implementing optioneering up front, right at the planning or conceptual stage of the project, the risk assessment process will be a thing that will help determine which option to adopt.
- Helps achieve best-practice for a project for it allows a project manager to assess project threats. In this way a project manager is able to engage active measures to counter project issues.
- In government projects, it reduces risk of a political backlash, embarrassment for the government, increase value for money, assist project prioritisation, and assist in getting funding.

On the overall Risk Management improves the efficiency in time, cost and value, and it allows greater control of the project, allowing better management of project threats.

At the end of the process, the benefits of Risk Management outweigh the costs or the penalties that people perceive about Risk Management.

“Any project manager that says: ‘Oh! I am not going to bother to do Risk Management on a project’ is not worth their salt really.”

Risk Management deterrents mentioned by most interviewees are listed below:

- Time consuming. It takes time to establish Risk Management, which often is a *‘luxury that project managers do not have in hard money environments’*. Also project loads often do not permit updates
- Cost of resource. Risk Management is seen as costly, especially on smaller projects or companies, because seldom it has a budget allocated for it and obviously the time spent in assessing the risk of a larger project is considerably greater than a smaller project. To get the stakeholders together to do the work shop and is another cost involved. Some clients do not want to wear that cost.
- Lack the manpower and the expertise to do so; smaller organisations do not have the resources or perhaps the experience in all the aspect of project management. This is not the case in larger organisations like government sector private sector, for they have more people on board and have the time to develop these systems and procedures.
- Due to the complexity of the work, there is reluctance to revise the Risk Management plan.
- It is not an implemented policy as it is seen to be too difficult.
- Potential of inertia. Project managers can sometimes be trapped into thinking that the Risk Management plan is to be all and end all of the project. Project manager must realise that the Risk Management plan is a *‘living document’*.
- Client’s with *‘fanciful ideas’*. Project manager have to make sure that they have identified the answer to the correct question because quite often they could have come up with an answer but it is not an answer to what the real issue was.

Yet a few project managers interviewed states that Risk Management is so embedded in everything they do that they are providing Risk Management principles even if without thinking about it or find any deterrents relevant anymore.

“Risks are going to do all sorts of things. They could give you adverse publicity or lack of confidence with a client, or some other key stakeholders may be dissatisfied, they could increase your costs or change your scope, which in turn will increase your costs, make it blow out. That could in turn cause you time and all of those things which contribute to the success of your project. It can diminish the success of your project. So unless you keep on top of your Risk Management those things could come as a nice surprise to you.”

4.2.7 Risk Management Implementation

It is emphasised by most project managers that Risk Management practices should be engaged at the initiation of each project. It should be implemented prior to project starting at the planning stage mainly, prior to detail design, and then updates during project. The main stages where Risk Management is usually initiated, especially for young practitioners, are conceptual, design and construction stage. Other stages noted are during the project proposal, at budget approval time, during project and at any time when the budget changes. Larger projects have more formalised stages, for example during concept design stage, there is a risk assessment for that, and then during design development stage, there is another risk session.

“Informally from the time of concept design, but formally before going for the client approval. So you can’t go and say give me a million dollars and I’ll do the Risk Management afterwards. You’ll have to already have done the risk, have a look at the risk before you ask for the money. So as part of your Risk Management plan you need to whole thing stitched up. Not something you do once and leave it alone, you might need to do it two or three times.”

4.2.7.1 Risk Management in Conceptual Stage

“Risk Management starts from day one. Always trying to determine where we can come unstuck in all the three aspects, time, quality and cost. So it is not something that starts at a particular point in time, it is an integral part of the process, every step along the way we are using some form of Risk Management.”

Project Managers keeps emphasising again in the interview that Risk Management is an integral part of what they do, particularly at the conceptual stage looking at options and the viability of the project. In the conceptual stage project managers goes through the Risk Management process and at the end of the conceptual stage reveals the options available to the client. The client says selects the preferred option and only then project manager proceeds into the other phases or stages, based on the client's preferred option.

“Just to remember to do it right up front. Everything you do, right from the concept stage has a risk component. The fact that you are trying to solve this problem is a risk in itself. So the risk is there right from day one, so you need to manage it right from day one.”

4.2.7.2 Risk Management in Other Stages

One project managers feels that for construction project, construction phase is the most important stage. By looking at all the effort or all the number of hours worked on a project, it is the period of highest risk because it is when all the activity happens. It is the project manager's job to look at it every now and again and just have to pay more attention to it when peak activity comes.

“In planning you can stab yourself with a pencil and you will live but when during construction, for example, a crane lifting a pipe underneath a power line and the pipe hit the power line and it killed someone, therefore defeating the idea that planning stage should have the most attention then the construction phase. Planning is when you do most of the think about the risks; it is when the construction occurs is when you're doing most of the doing about risks, more of the controlling. That is when the risks are happening like this (drawing curve going up); it doesn't come down until after the project has finished in terms of the lifecycle. It is delayed (referring to the risk activity).”

4.2.7.3 Maintaining Risk Management

Risk Management should be implemented throughout the whole project, right over to the final handing over. It is no good getting halfway through the project and identifying some risks, which if were identified back at the beginning of the project, practitioner would have taken a different look at it, or even maybe handling it differently.

If it is a small project then project manager tends to formally follow the risks throughout the whole project, just a quick glance every now and again, and think about it now and again. If it is a large project like a million dollars, then it might review month to month. It depends again on the nature of the risk, if the risks workshop identifies some extremely high risks then project managers got to keep them in mind all the time no matter what the cost is. Even though the client is not paying to do it, it is in the project manager's best interest to monitor extreme risks.

“It is not just the dollar side of things it is also what could come out of left field to knock the project over and that is why I say it is an integral part of our thought process and trying to minimise the risk to the project both financial, time wise and quality wise.”

4.2.8 Advantages and Disadvantages of RM Implementation at Conceptual Stage

“I’m a bit committed to Risk Management especially from the conceptual stage. I think it’s a key component of managing a project and it’s as important as managing any other component as a project, if not more important sometimes. But there’s always then the business imperative. If you don’t manage your risks you can expose yourself to litigation these days as well. So while it’s going to help you get the best outcome for your project there’s always in the background, in this day and age, your own business imperative. If you don’t manage the risks early you’re leaving yourself open to problems.”

Sample of Risk Management Plan in the Conceptual Stage used in the software industry (see Appendix C)

The advantages of implementing Risk Management in conceptual stage are as listed below:

- Forward budget planning, reduce political risk, reduce fluctuation of spending, timelier deliveries and allow better compilation of projects into programs
- Best to figure out what are the major threats to the project at the start as it costs less to change documentation, rather than rebuilding a wall.
- A chance of saving costs. If Risk Management is not implemented, it may come as a complete surprise and there will definitely be cost implications. Whereas project managers can put in place strategies to mitigate the impact and therefore mitigate the costs.
- Ability to deliver the project as well, successfully, to the client's requirements

“A project manager's job is to fix the problem, but as humans we do make mistakes and we can't take care of everything. One of the most important things is to sit there and try to blame somebody, go on and fix the problem first and then review the situation after you fix the problem. At which point you try not to think of it as a blame game, just try to find out why it happened make sure it doesn't happen again.”

There should not be any disadvantages in providing Risk Management early in the project. That is the whole point of Risk Management and that is why globally these days in project management the recognition that Risk Management is a key factor in trying to minimise the problems and difficulties you've got with delivering a project. In fact, the disadvantages of NOT providing Risk Management in the early stages are budget overrun, time or programme overrun, bad quality of work, political embarrassment, public backlash and attract bad publicity to the client and project management themselves. The adverse impact could be not necessarily financial, it could be environmental or economic or social impacts or whatever. Unidentified risks quite often do have financial impacts but financial will only be one component.

“It is going to cost you more. A part of Risk Management is cost mitigation as well, because cost blow out is a risk. If you don't do it early enough then you got to pay the penalties.”