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8th AMER International Conference on Quality of Life

Mahkota Hotel Melaka, Malacca, Malaysia, 18-19 Mar 2020
(Due to the Covid-19 lockdown, paper virtually presented on 25 Mar 2020)

e-IPH
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Reviewing Risk Process Integration Effectiveness into Malaysia's Landscape Architecture Project Lifecycle

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Abstract

This paper explores the effectiveness of risk process integration into landscape architecture project lifecycles, a subject that found to be lacking in risk management studies. The fieldwork of data collection conducted through structured interviews as well as document reviews from three completed landscape architecture projects in Klang Valley, Malaysia. The collected data analysed using content and thematic analysis. The research found that the risk process ineffectively integrated into project lifecycle with results presenting incomplete process, unplanned and redundant activity flows. The study suggests that common practice constrains practical risk management application that then restrains its benefit realisation.

Keywords: risk management; risk process; project lifecycle; landscape architecture project

DOI: https://doi.org/10.21834/e-bpj.v5i13.1991

1.0 Introduction

Landscape architecture projects are dynamic, with subjective outcomes and various challenges due to the projects' uncertainty. The projects' complexity in nature subjected to multiple risks that are bound to happen (Capouya et al., 2012; Godi & Sibelius, 2012; Meijering et al., 2015; Schatz, 2003).It is best to manage these determined risks at the earliest phase possible in a project's lifecycle before it becomes an issue that eventually affects the project's performance. Malaysia landscape architecture project is part of the construction industry that recognised with a multitude of risks involved, commonly safety risk (Adnan & Rosman, 2018; Ismail et al., 2017; Kurzi & Schroth, 2018; Maruthaveeran, 2016; Shafie et al., 2018; Shamsudin & Majid, 2019), financial risk (Adnan & Rosman, 2018; Ansah et al., 2016; Fadzil et al., 2017; Omer et al., 2019; Razi et al., 2020), technical risk (Adnan & Rosman, 2018; Hasan et al., 2018; Kurzi & Schroth, 2018; Razi et al., 2020; Saaidin et al., 2016; Sani, Sharip, et al., 2018), quality risk (Mohit, 2018; Sani, Mustafar, et al., 2018; Sani, Sharip, et al., 2018; Wena et al., 2017) and enviromental risk (Hasan et al., 2018; Marmaya & Mahbub, 2018; Maruthaveeran, 2016; Razi et al., 2020; Saaidin et al., 2016; Shafie et al., 2018; Thani et al., 2017). However, risk management in the extension of landscape architecture projects in Malaysia not widely practised, wherein its risks managed unsystematically (Kurzi & Schroth, 2018). Risk management beneficial for construction projects to enhance its performance regularity through precise and systematic risk management during its conception (Keers & van Fenema, 2018; Olechowski et al., 2016; Willumsen et al., 2019). It since integrated as part of the project management process (APM, 2012; ISO 31000:2018, 2018; PMI, 2017).

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DOI: https://doi.org/10.21834/e-bpj.v5i13.1991

The dynamic, complexity and fast-tracked nature common to landscape architecture projects require its risk management application to be integrated holistically into the project management's structure. As explained in the latest ISO 31000:2018 (2018) standard, risk management is an integral part of all activities. The risk process is to be proportionally customised into the organisation's context wherein the combination of these processes would further ease a landscape architect's practice. In support, Arashpour et al. (2016) posited that this is to counter a fast-tracked and high demanding landscape industry that eradicates the need to focus on the two processes separately. Therefore, the project undertaking is significant scope in the landscape architecture industry. The practitioner requires a sound knowledge to meet the scope of practice covering all phases of work throughout a project's development (Hasan et al., 2018). Hence, risk management should integrate into a project's lifecycle as one procedure. Further explained in PMI (2017), such integration needs to be practised simultaneously and throughout the project's lifecycle to avoid unnecessary redundancy.

A risk management system is an established knowledge that vastly practised worldwide, where most of its standards and guides discuss the principles, process, strategy and its methodology of practice. It is equally essential management system as environmental management system (Marmaya & Mahbub, 2018; Shafie et al., 2018) and health & safety management system (Ismail et al., 2017; Marhani et al., 2018), that commonly applied in Malaysia construction sector. Nevertheless, there is a lack of study on how the risk process integrated into a project lifecycle. It has seen that only a few authors had attempted to discuss such integration, and even fewer have directly applied it towards construction, particularly on landscape architecture projects. Therefore, this study aims to review the effectiveness of current risk process' application within the project lifecycle. The objectives to accomplish aims following, 1) to determine current risk process practice, 2) to analyze landscape architecture project lifecycle and 3) to review risk process integration effectiveness into the project lifecycle.

2.0 Literature Review

2.1 Risk Process

The risk process consists of several steps which may vary from one standard or guideline to another; with the maximum being eight steps. Through the study, it can establish that there is a variance in risk process terminology and grouping pattern. Nevertheless, the risk process is still similar, despite having a different sequence of steps. The process is grouped into six significant risk groups due to its similarity in its methodology and notably found in several significant standards. The risk process categorised as; 1) Communication and Consultation, 2) Establishing Risk Context, 3) Risk Identification, 4) Risk Analysis, 5) Risk Treatment, and 6) Monitoring and Review. These processes reviewed from eight risk management standards and guides that compiled in Figure 1 below.

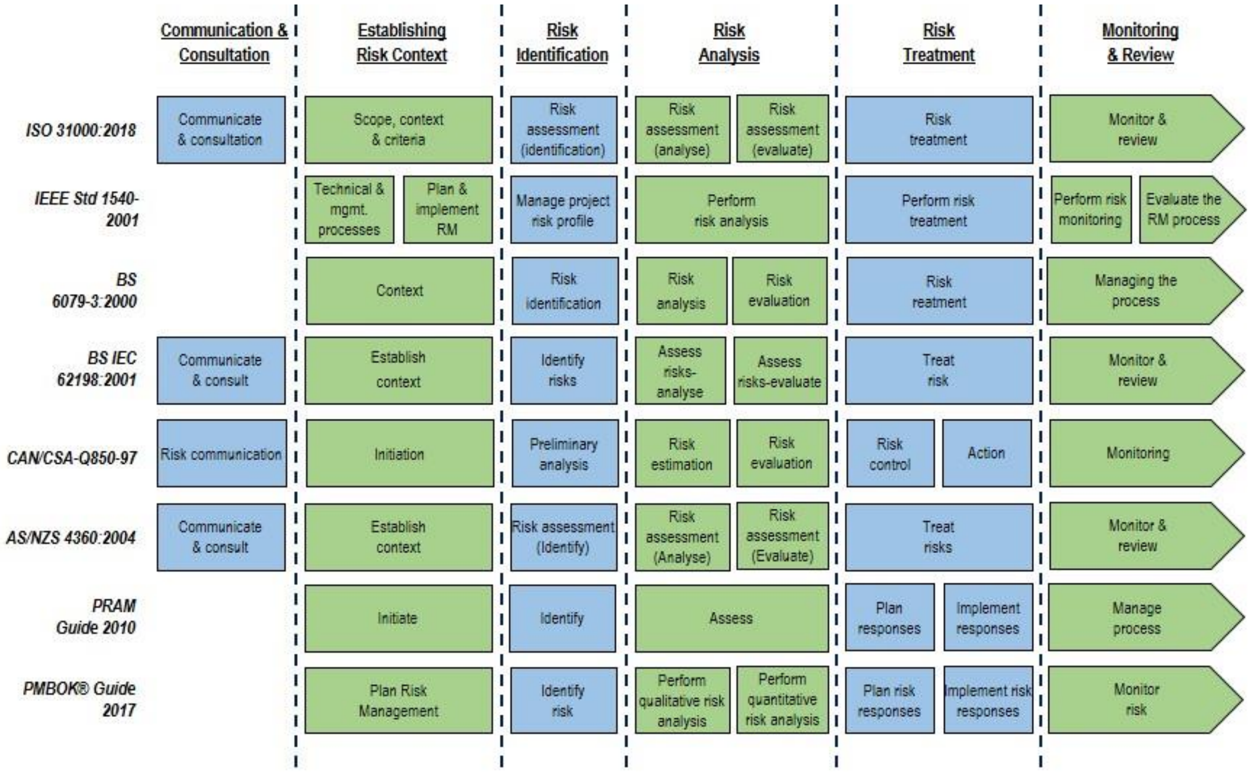


Fig. 1: Risk process from eight risk management standards and guidelines
(Source: APM 2010; AS/NZS 4360:2004 2004; BS 6079-3:2000 2000; BS IEC 62198:2001 2001; CAN/CSA-Q850-97 2002; IEEE Std 1540-2001 2001; ISO 31000:2018 2018; PMI 2017)

Discussed in Adnan & Rosman (2018), Fadzil et al. (2017), Hamzah Abdul-Rahman, Chen Wang (2015), Kang et al. (2015), Mohamed et al. (2014), Omer et al. (2019), and Taofeeq et al. (2020). Malaysia construction industry practised risk process in ill-structured and implemented informally, although a formal risk management process has introduced. Malaysia construction industry adopting simple, quick, reasonable and inexpensive methods identifying risk instead of managing it at the whole process. Risk not managed comprehensively and not follow the suggested process due to lack of knowledge of risk management implementation and lack of awareness of its benefits.

2.2 Landscape Architecture Project Lifecycle

A project lifecycle, according to the Association for Project Management is a collection of generally sequential, time-based, project phases whose name and numbers are determined by the central needs of the organisations' involved in the project. However, project lifecycle differs across various industries and businesses (APM, 2012; BS 6079-1:2010, 2010). Due to such complex and diverse nature of these projects, there is seldom a synonymous agreement among industries or even between organisations regarding the same scope of lifecycle phases (Kerzner, 2009). According to the Project Management Institute, a typical project lifecycle's structure mapped into four generic phases, namely; starting the project, organising and preparing, carrying out the work, and closing the project (PMI, 2017). Similarly, APM (2012) had divided project lifecycle into four phases; i.e. concept, definition, development, handover and closure. It then extended to another two phases; i.e. benefits realisation and operation. Meanwhile, BS 6079-1:2010 (2010) established project lifecycle into five phases that are conception; feasibility; implementation; operation; and termination. Additionally, project management author Kerzner (2009) determines project lifecycle into five phases; conceptual, planning, testing, implementation and closure. Generally, according to BS 6079-1:2010 (2010), project lifecycle comprises of two to six phases but is seldom more than ten. Concerning these discourses within Malaysia context of practice, the research summarises that project lifecycle is divided into four groups; initiating, planning, executing and closing. Further sub-categorised it into seven additional phases, as illustrated in Figure 2 below.

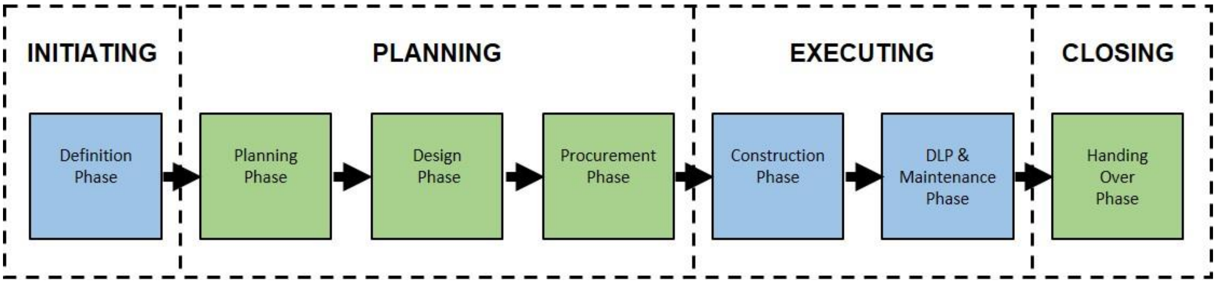
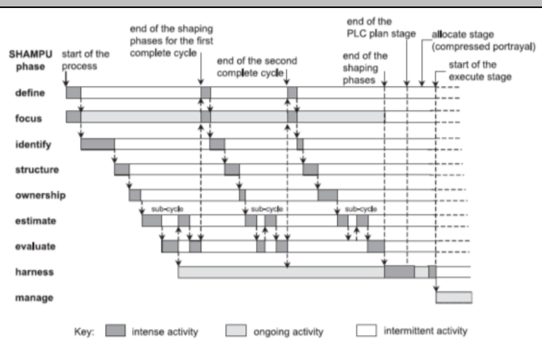


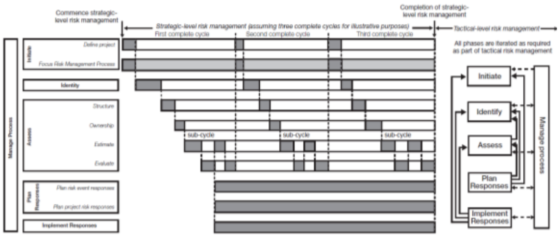
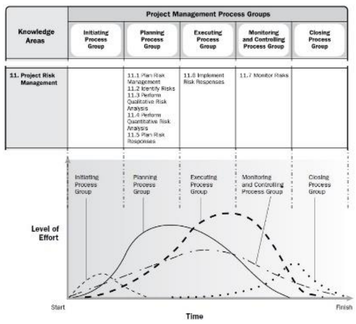
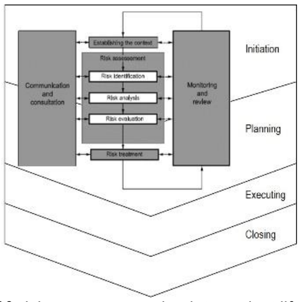
Fig. 2. Landscape Architecture Project Lifecycle
(Source: Adapt from APM, 2012; BS 6079-1:2010, 2010; Kerzner, 2009; PMI, 2017)

2.3 Reviewing Risk Process Application and Integration into Project Lifecycle

The integration of risk process into project lifecycle reviewed from four sources; (APM, 2010; Chapman & Ward, 2003; ISO 31000:2018, 2018; PMI, 2017), detailed in Table 1 below. As reviewed, establishing a risk context is recommended to be initiated at the earliest possible timeframe during the project definition phase. It then continued with a risk assessment process (comprise of risk identification, analysis, evaluation) and risk treatment process. This process should then be carried out soonest within the specified project planning phase, which the integration is empirical to manage the risk. APM (2010) and C. Chapman & Ward (2003) strongly suggested that the risk process would eventually complete after two or three iterative loop cycle by the end of the planning phase. The implementation of risk treatment could then ideally addressed upon each loop cycle completion within the earliest level of the design phase. Whereas, risk monitoring, controlling and communication are practised throughout the project lifecycle.

Table 1. Comparative study - risk process integration into the project lifecycle

Source	Description and identified aspect for effective risk process integration into the project lifecycle	Diagrammatic description
C. Chapman & Ward (2003)	• Risk process - SHAMPU nine processes; define, focus, identify, structure, ownership, estimate, evaluate, harness and manage • Project lifecycle - Eight phases; conceive, design, plan, allocate, execute, deliver, review and support • Risk process starts at the earliest' define and focus phases as an intense activity • Complete three risk process iterative cycle that takes place towards the end of the planning phase • Two' estimate and evaluate' risk process – sub-cycle process sequentially to initiate 'harness' process of the first five process • 'Harness' process begins intensely during the allocate phase, once three risk process iterative cycle loop complete • 'Manage' process starts at the execute phase as an ongoing activity	

		SHAMPU iterative loops between phases and interpretation with the project lifecycle Source: Chapman & Ward (2003, p. 60)
APM (2010) Supporting: C. Chapman & Ward (2003)	• Adapted from C. Chapman & Ward (2003) • Risk process - five phases; initiate, identify, asses, plan responses and implement responses • Risk process carried at the earliest initiation phase • First, complete risk process cycle ideally before significant commitments made • Risk process performed three complete cycles, known as strategic-level risk management cycles, to be initiated at the earliest project initiation phase and completed by the end of the planning phase • Continuum of risk process perform iteratively and managed concurrently throughout the project lifecycle, known as tactical-level risk management cycles • Implementation of risk responses intensively to the rest of the project lifecycle phase starts at the first risk process cycle completion.	 Iterative (multiple-pass looping) structure of risk process into the project lifecycle Source: APM (2010)
PMI (2017) Supporting: Kerzner (2009)	• Risk process - nine phases; plan risk management, identify risks, perform a qualitative risk analysis, perform a quantitative risk analysis, plan risk responses, implement risk responses and monitor risks • Integration indirectly mapped into five project management process groups; initiating, planning, executing, monitoring and controlling, and closing • plan risk management, identify risks, perform a qualitative risk analysis, perform quantitative risk analysis and plan risk responses practice to be performed under planning process group, in sequence • Implementation of risk responses are performed during the executing process while group monitoring of risks performances are performed under the monitoring and controlling process group	 Project management process group and risk process mapping within project phase interaction Source: Adapt from PMI (2017)
ISO 31000:2018 (2018a) Supporting: BS 31100:2011 (2011)	• Risk process is theoretically performed in sequence throughout the project lifecycle to three phases; establish the context, assess risks and then treat the risks. • Risk assessment at the planning phase, applied many times with different levels of detail • Risk treatment is a continual step after a risk assessment • Implementation of risk treatment carried through to the remaining project lifecycle phases • Communication and consultation, establishing the context, and monitor and review start earlier and throughout the project lifecycle	 ISO 31000 risk process mapping into project lifecycle Source: Adapt from BS 31100:2011 (2011, p. 32)

(Source: APM 2010; BS 31100:2011 2011; Chapman and Ward 2003; ISO 31000:2018 2018a; Kerzner 2009; PMI 2017)

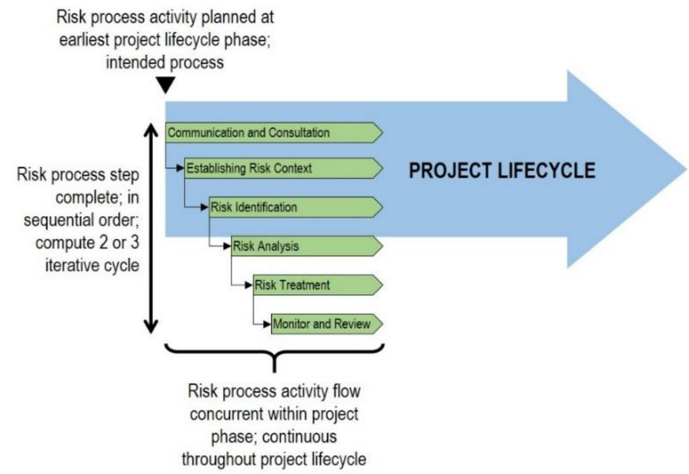


Fig. 3. Extracted aspect for effective risk process integration into the project lifecycle
(Source: Author, 2020)

To conclude, an effective risk process integration into project lifecycle should fulfil these three aspects; 1) process step completeness, 2) process activity planning and 3) process activity flow. This aspects simplified and graphically illustrated in Figure 3. Firstly, the risk process requires to complete all the six-steps, followed in sequential order and compute into two to three iterative cycle. Secondly, risk process activity is planned and initiated at the earliest phase of the project lifecycle as an intended process. Finally, to determine its success, the risk process activity flows as a concurrent process within the project phase and to be a continuous activity throughout the project lifecycle.

3.0 Methodology

This paper applied a qualitative case study approach to investigate the effectiveness of risk process integration into the project lifecycle by way of quantifying the fulfilment of the three aspects discussed above. It engaged an exploratory research purpose that provided flexibility to the researcher to formulate the research development strategy as well as to develop a systematic process for carrying out the study (Yin, 2016). The fieldwork data collection gathered through document reviews and structured interviews with project managers from three completed landscape architectural projects. The interview audios and project documents recorded; transcribed into the text; documented and organised in *ATLAS.ti 8* research software. The data analysis employed a content analysis for describing and interpreting deductive codes, categorising and finalising the themes (Mayring, 2014). Further, a thematic analysis was then employed to synthesise and draw thematic map between the themes while seeking inductive codes. The analysis includes exploring the relationship between the studied subject categories, seeks pattern and finally interpreting the results (Maguire & Delahunt, 2017).

4.0 Findings

4.1 Case Project Information

Three completed landscape architecture projects were selected based on predetermined sampling criteria. Criteria consisted of; landscape architecture scope of work with traditional procurement route, involved in all project lifecycle phase, completed within the past ten years and of medium to a large-sized project in an urban area within Klang Valley, Malaysia. The projects' information presented in Table 2 below.

Table 2. Case project information

Detail	Completed Landscape Architecture Project		
	P1	P2	P3
Location	Damansara	Serdang	Shah Alam
Client	Private Property Developer	Government	Private Property Developer
Local Authority	Majlis Bandaraya Petaling Jaya	Majlis Perbandaran Sepang	Majlis Bandaraya Shah Alam
End-user	House owner	Government Institution	House owner / Tenant
Category	Residential (high-rise)	Recreational	Commercial & Residential (landed)
Gross Landscape Area	4 acres	280 acres	138 acres
Project Scope	Soft landscape Works; Hard Landscape work; 18 months Maintenance Works	Planning and Development; Soft Landscape Works; Hard Landscape work; 24 months Maintenance Works	Soft landscape Works; Hard Landscape work; 24 months Maintenance Works
Landscape Work Cost	RM 6.7 million	RM 29 million	RM 11 million
Project Timeline (months)	33 months	42 months	38 months
Commencement	*Jan-14*	*Jun-10*	*Apr-12*
Completion	*Sep-16*	*Dec-13*	*May-15*
Construction Tendering Method	Selective	Selective	Selective
Construction Contract Type	Conventional	Conventional Fast Track	Conventional

4.2 Risk Process - Step Completeness Practice

As was previously discussed, the first determinant factor in effective integration is through the completeness of the six steps of risk process practised in a project lifecycle. Accordingly, all the projects subjected to such measurements, and it found that the most successful at integrating all the steps of risk process in a complete order (100%) was project P1. Meanwhile, project P2 practised 3 out of 6 (50%) risk process intermittently, and 3 out of 6 (50%) steps incompletely. Lastly, project P3 practised the majority 3 out of 4 (75%) risk process step incompletely. Overall, the majority of 6 out of 12 (50%) had managed the risk process step incompletely. In summary, it observed that, in the case-studied projects, all 12 (100%) risks common in landscape architecture projects were identified. Still, only 7 (58%) of these risks analysed and 8 (67%) of these risks treated. Nonetheless, only 2 (17%) communicated these risks and established the risks' context, respectively. Meanwhile, a total of 8 (67%) risks monitored. The results are detailed and tabulated below in (Table 3).

4.3 Risk Process – Activity Planning and Starting Point

Secondly, this research then studied the risk process activity planning and starting point, to review the success in risk process integration into the project lifecycle. It found that, project P1 recorded a majority of 64% risk activity throughout their project lifecycle that extended to; identify, analyse, and treat in which its implementation of treated risks was concisely planned and within intentionality. Nevertheless, other risk activities such as to communicate, establish context and monitor practised unintendedly. Meanwhile, a substantial 59% of project P2 recorded its risk activity as unplanned and practised unintendedly. Only two (7%) of its risk activity were planned and practised intentionally. Lastly, similar to project P2, a majority of 53% of project P3's risk activity was unplanned and practised unintendedly. At the same time, it also recorded no activity in communicating risk. Overall, the results showed that 53% of risk activity was unplanned and practised unintendedly. It appeared that the risk process often performed in an ad-hoc manner. It performed in a reactionary respond upon risk identification, contributing to only 16% of its risk activity as planned with a specific intention to manage it within the project lifecycle (Table 4).

Furthermore, the study reviewed risk activity starting point in the project lifecycle phase. The results showed that 7 out of 12 (58%) went through the risk activity of identify-analyse-treat at the earliest planning phase of the project lifecycle phases. Only 2 out of 12 (17%) identify-analyse-treat risk activity started at the earliest definition phase. The remaining risk activity usually starts at the procurement phase. Meanwhile, project P1 effectively started the communication-establish context-monitor risk activity at the definition phase. In contrast, project P2 and P3 ineffectively implemented the communication-establish context-monitor risk activity at a later phase of their project lifecycle. However, mostly non-activity was also found (Table 4).

Table 3. Risk process step

Project	Risk No.	Risk Category	Risk Event	Risk Impact	Risk Process Step						Overall Risk Process Step Completeness
					Comm.	Est. Context	Identify	Analyze	Treat	Monitor	
P1	1.1	Cost	Incompetent main contractor management	Late site handle over, insufficient information feed and poor site coordination	●	●	●	●	●	●	Complete
	1.2	Technical	Incompetent landscape contractor to carry out unique structure works	Structural failure and safety concern	●	●	●	●	●	●	Complete
P2	2.1	Enviro.	Project residual to water bodies	Water pollution to project neighbouring wetland			●	●	●	●	Intermittent
	2.2	Planning	Heavy human traffic and accessibility constraints during a major event.	Event attendees discomfort and redundant area unvisited			●	●	●	●	Intermittent
	2.3	Organisation	Changing of client management	Delay to design schedule and client dissatisfactory			●			●	Incomplete
	2.4	Operation	Interference of contractor selection based on merit and recommendation	Difficulties in project deliverables and quality			●	●		●	Incomplete
	2.5	Operation	Huge landscape maintenance package and management complexity	Poor maintenance, workmanship and constraint in coordination.			●	●	●	●	Intermittent
	2.6	Schedule	Client delaying planning-design work approval	Project delay and increase of business operation cost			●		●	●	Incomplete
P3	3.1	Cost	Additional work unpaid and unrecorded - transfer scope work from engineer to landscape	Effect to operation cost and schedule			●	●			Incomplete
	3.2	Technical	Technical difficulty on unique water feature	Quality outcome, buildable practicality and safety issues			●	●	●		Intermittent
	3.3	Quality	Underperformance contractor appointed by the client	Poor workmanship and defect			●		●		Incomplete
	3.4	Schedule	Client delaying design sign-off.	Delay in construction drawing and tender preparation			●	●			Incomplete

Notes:

Complete : Six (6) risk process step practiced

Intermittent : Three (3) core risk process step (Identification-Analysis-Treatment) practised

Incomplete : Three (3) core risk process step (Identification-Analysis-Treatment) not practised

4.4 Risk Process – Activity Flow

Finally, the third factor studied was the risk process step flow in reviewing risk process integration into the project lifecycle. Project P1 managed all (100%) risk process step to identify-analyse-treat its risks concurrently within its project lifecycle phases. The procedural steps undertaken were common; observation upon risk's identification, then the risk would be immediately analysed and then treated within the same timeframe. Contrarily, project P2 managed 3 out of 6 (50%) identify-analyse-treat, where its risk process step was often redundant and incomplete. Additionally, only 2 out of 6 (33%) managed its risk process step consecutively across different project lifecycle phases. Similarly, project P3 managed a majority of 3 out of 4 (75%) risk process step redundantly as the steps take addressing risks were often incomplete. Overall, project P3 managed 5 out of 12 (42%) identify-analyse-treat risk process step in redundancy as these steps too were often incompletely done in its sequential order. The flow of the risk process was usually interrupted as its process is often discontinued afterwards. Additionally, only 4 out of 12 (33%) managed the risk process step consecutively across different project lifecycle phases. Commonly in practice, risks are already observable and identified during the definition planning phase of the project. Nonetheless, it would only critically analyse and later treated in the procurement phase of the project lifecycle. (Table 5)

5.0 Discussion

Comparisons were made between the three case studies to determine the effectiveness of risk process integration into the project lifecycle. The measurements evaluated to; risk process step completeness, risk process activity planning and risk process activity flow. The discussion is concerning the comparison of the results, which simplified in Figure 4. From the illustration, it can deduce that project P1 is moderately effective in its integration of risk process in their project lifecycle within completing the risk process step orderly. Risk activity planned and intended address at the earliest outset of the planning phase while the activity flow concomitantly performed within the project phase. In contrast, project P2 evaluated as ineffective in integrating the risk process into its project lifecycle. This evaluation supported with evident risk process practised during the project lifecycle in an intermittent manner and sequentially incomplete steps. The risk process activity was unplanned and unintended despite earlier risk identification at the planning phase. Apart from that, a complete identify-analyse-treat cycle was performed consecutively, across another phase of the project. Additionally, some redundancy of activity flow was also detected. Similarly, project P3 is the least effective in the risk process integration into their project lifecycle. To the extent that, the risk process was majorly practised in incomplete steps, unplanned and mostly ended up to be redundant in the risk process flow.

In summary, the research estimates that the risk process integration in Malaysia's landscape architecture project lifecycle is ineffective. This considering factors indicated through incomplete steps in the procedural practises of risk process, unplanned risk activity and redundant flow. This similar practice discussed in Adnan & Rosman (2018), Fadzil et al. (2017), Hamzah Abdul-Rahman, Chen Wang (2015), Kang et al. (2015), Mohamed et al. (2014), Omer et al. (2019), and Taofeeq et al. (2020). They pointed Malaysia construction risk process practised in ill-structured, informal and not follow suggested step. The findings demonstrate huge contrast relative to the effectual risk process integration as suggested by APM (2010), Chapman & Ward (2003), ISO 31000:2018 (2018), and PMI (2017) whereby risk process should practise in a complete and sequential step. Its includes the establishment of the risk context at the earliest project phase as well as performing risk communication and monitoring risks continuously throughout the project lifecycle. Additionally, risk process activity is to be planned at the earliest definition of the project lifecycle phase and performed concurrently within the same timeframe.

Table 4. Risk process – planning and starting point

Project	Risk No.	Risk Process	Process Activity Planning			Activity Starting Point In Project Lifecycle Phase
			Intended	Unintended	Non-Activity	
P1		Communicate Risk		●		Definition
		Establish Risk		●		Definition
	1.1	Identify Risk	●			Planning
		Analyse Risk		●		
		Treat Risk	●			
		- Implementing Treated Risk	●			
	1.2	Identify Risk	●			Procurement
		Analyse Risk	●			
		Treat Risk	●			
		- Implementing Treated Risk	●			
		Monitor Risk		●		Definition
P2		Communicate Risk		●		Design
		Establish Risk			●	-
	2.1	Identify Risk		●		Planning
		Analyse Risk		●		
		Treat Risk	●			
		- Implementing Treated Risk	●			
	2.2	Identify Risk		●		Planning
		Analyse Risk		●		
		Treat Risk		●		
		- Implementing Treated Risk			●	
	2.3	Identify Risk		●		Planning
		Analyse Risk			●	
		Treat Risk			●	
		- Implementing Treated Risk			●	
	2.4	Identify Risk		●		Definition
		Analyse Risk		●		
		Treat Risk			●	-
		- Implementing Treated Risk			●	-
	2.5	Identify Risk		●		Procurement
		Analyse Risk		●		
		Treat Risk		●		
		- Implementing Treated Risk			●	-
	2.6	Identify Risk		●		Planning
		Analyse Risk			●	
		Treat Risk		●		
		- Implementing Treated Risk		●		
		Monitor Risk		●		Definition
P3		Communicate Risk			●	-
		Establish Risk			●	-
	3.1	Identify Risk		●		Planning
		Analyse Risk		●		

		Treat Risk		●	-
		- Implementing Treated Risk		●	-
	3.2	Identify Risk	●		Planning
		Analyse Risk	●		
		Treat Risk	●		
		- Implementing Treated Risk		●	
	3.3	Identify Risk	●		Procurement
		Analyse Risk		●	
		Treat Risk	●		
		- Implementing Treated Risk		●	
	3.4	Identify Risk	●		Definition
		Analyse Risk	●		
		Treat Risk	●		
		- Implementing Treated Risk		●	-
		Monitor Risk		●	-

Table 5. Risk process – activity flow within the project lifecycle

Project	Risk No.	Risk Process	Process Activity In Project Lifecycle						Overall Risk Process Activity Flow Within Project Lifecycle
			Def.	Plan.	Design	Proc.	Const.	DLP / Maint.	
P1	1.1	Identify Risk		●					Concurrent
		Analyse Risk		●					
		Treat Risk		●					
	1.2	Identify Risk				●			Concurrent
		Analyse Risk				●			
		Treat Risk				●			
P2	2.1	Identify Risk		●					Concurrent
		Analyse Risk		●					
		Treat Risk		●					
	2.2	Identify Risk		●					Consecutive
		Analyse Risk				●			
		Treat Risk				●			
	2.3	Identify Risk		●					Redundant
		Analyse Risk							
		Treat Risk							
	2.4	Identify Risk	●						Redundant
		Analyse Risk				●			
		Treat Risk							
	2.5	Identify Risk				●			Consecutive
		Analyse Risk				●			
		Treat Risk						●	
	2.6	Identify Risk		●					Redundant
		Analyse Risk							
		Treat Risk		●					
P3	3.1	Identify Risk		●					Redundant
		Analyse Risk				●			
		Treat Risk							
	3.2	Identify Risk		●					Consecutive
		Analyse Risk		●					
		Treat Risk				●			
	3.3	Identify Risk				●			Redundant
		Analyse Risk							
		Treat Risk				●			
	3.4	Identify Risk	●						Consecutive
		Analyse Risk		●					
		Treat Risk		●					

Notes:
Concurrent ; *Risk process step flow within the same project lifecycle phase*
Consecutive ; *Risk process step flow across different project lifecycle phase*
Redundant ; *Risk process step incomplete*

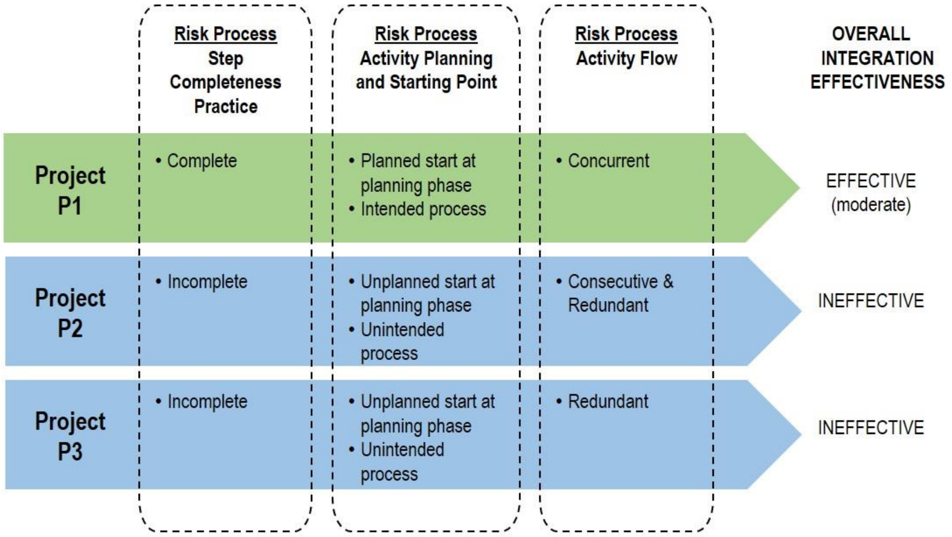


Fig. 4. Comparison case to case project integration effectiveness

6.0 Limitation of Study

The following are the limitations associated with the study. First, the case project focused on preference on urban landscape architecture context; another context not selected. Second, the risk process integration was only limited within the scope from the initiating phase to handing over the phase, excluding extended project lifecycle encompasses to project benefit realisation and management. Third, the risk process policies, procedures and practices may be the essential parameter to review the integration effectiveness not explored.

7.0 Conclusion & Recommendations

The study measured three aspects considered in evaluating risk process integration into project lifecycle to determine its effectiveness (i.e. process step completeness, process activity planning, and process activity flow). The findings indicate a disparate reality in an actual landscape architecture practice in contention to suggested risk management literature. The differences in practice in actuality constrain effective risk management application in landscape architecture projects. This study may help landscape architecture practitioners to evaluate their current practice and move forward for improvement in regards to risk management. The integration complements risk management application, where project activities could integrate into one inter-related process by which the activities are customizable to the organization's context. This practice will enhance understanding and elevate risk management and its application of landscape architecture projects in Malaysia.

Thus, further study recommended specific strategies to formulate successful risk process integration into the project lifecycle. It can complement the context of landscape architecture and supplicates its dynamism through accommodating its complex and fast-tracked nature.

Acknowledgement

We appreciate the financial support of this study from Geran Putra - Inisiatif Putra Siswazah (GP-IPS), Universiti Putra Malaysia (Project Number: GP-IPS/2018/9617500).

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