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Project practitioner experience in risk ranking analysis – an empirical study in Malaysia and Singapore

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Abstract

Despite the Information Technology (IT) sector's continuing growth driving massive demand for IT project practitioners, the high failure rate of IT projects has caused enormous losses for many organizations. Establishing effective and proactive practice for project risk management (PRM) is imperative. Risk exposure scoring is becoming a critical risk classifier in prioritizing items in descending order, developing plans to address the most significant factors, and leaving the rest on a "watch list". This study analyzes responses from targeted project managers (PM) in Malaysia-Singapore to a survey. The author ranked the intrinsic risk of projects and investigated the effect of a project practitioner's level of experience in risk assessment. The results indicated that a project practitioner's assessments of risk depend on the number of years of experience acquired.

Keywords: ranking project risk, project management techniques, assessment tool, project management success, practitioner experience

1. Introduction

Today, global competition requires organizations to be more capable, agile, and responsive to rapid changes. Organizations view projects as "powerful strategic weapons", generating economic value and competitive advantage. As a result, the roles of project managers (PMs) have expanded into strategic leadership roles that include full accountability for project business outcomes [24]. Thus, project management is a unique business skill set for industry and a "new" form of organizational general management practice [23]. The unique hierarchy of project teams enables organizations to adapt to changes more quickly than non-project-based teams [3]. Nonetheless, the rate of overall project success, measured via the iron triangle model, remains low [25].

Project Risk Management (PRM) practices are essential to the success of any project. They involve the techniques and processes required to identify, mitigate, or avoid potential problems proactively. Inherent project risks usually present a threat, but they can also offer opportunities. Progressive risk management

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practice ensures that high priority risks are addressed directly and enables project governance bodies, such as Project Management Offices (PMOs) and Steering Committees (SCs), to have the necessary, up to date information facilitating appropriately informed decisions. PMs must be knowledgeable about risk management, planning, monitoring, tracking, and execution.

As project risks progressively become more significant, it becomes challenging for the PM to monitor, track, and create appropriate response plans for each risk factor that changes situationally. The best practice is to logically separate risks into top risk categories (usually medium to high) and lower risk categories. As a result, PMs should focus on the top risk factors and develop a valuable response plan accordingly, leaving the remaining risk factors on a "watch list" using exposure score as an effective classifier. Occasionally, project stakeholders incorrectly classify high-risk factors as low-risk ones, resulting in a lack of a response plan. This study aims to gain insight into risk ranking based on the length of experience of project practitioners.

This paper presents a literature review of relevant failure studies, and a quantitative survey research strategy for sampling, data collection, and analysis is adopted. The next section describes the statistical methods used to analyze the data with respect to risk assessment. This is followed by a discussion of the findings and conclusion.

2. Literature review

Previous research studies have documented 17 risk factors [5, 10, 11, 12, 14, 15, 18, 19, 26, 27]. Through grouping similar types of risk factors and the elimination of two irrelevant, non-critical risks, the total number of risk factors was reduced to eleven for the development and fine-tuning of the survey questionnaires. The risk factor, **R1** - *Change in Project Scope*, is considered to elevate risk and can often be critical if changes are made at the end of a "waterfall" project [18].

Other important factors concern the inability to discover and correct a deflated budget or impractical timetable, and the routine underestimation of workloads. In the cost and schedule dimension, the risk factor **R2** - *Underestimating Costs and Time*, includes root causes such as underfunding (insufficient budget), the inadequate definition of timescales, and unrealistic deadlines. If such risk is not mitigated during the project's life cycle, it could have disastrous repercussions [5].

From the perspective of project governance, the risk factor **R3** - *Lack of Top Management Governance and Sponsorship*, is related to the lack of a mechanism and/or strategy for steering a project, which is strongly related to the skills of the steering committee. Some established project management offices (PMOs) frequently play a crucial role in the policies, processes and steering of project realization [26].

Large and complex projects are distinguished by their extended duration, increased risk, cost, high complexity, and large team size, requiring superior communication and coordination. The risk factor **R4** - *Project is Too Large and Complex* is associated with failures directly resulting from a project's size and complexity. Poor delivery strategies can have fatal consequences [12].

Unlike the risk factors described above, the risk factor **R5** - *Poor Management of Requirements* is primarily caused by failures resulting from the insufficient definition of requirements or lack of information regarding them after project initiation. This often becomes a systematic risk, consistently increasing in scope and impact throughout the entire project life-cycle [11].

R6 - *Poor Stakeholder Management* is a significant risk factor due to conflict among stakeholders with varying interests. Undesirable stakeholder behaviours include the project team being unwilling to execute changes, customers/users being reluctant to accept changes to a system, processes, or project deliverables, and constantly being resistant to change, resulting in a lack of project stakeholder involvement and participation [15].

When viewed from the perspective of project methodology, the risk factor **R7** - *Lack of a Methodology for Project Management* is related to the choice of project methodology. Usually, this choice falls into one of two major categories: "agile" or "waterfall". Many organizations tailor their methodology of project management in alignment with organizational processes. Omissions of critical guidelines, lack of an integrated methodology, and selection of an inappropriate method may adversely affect project success [19].

The risk factor **R8** - *Poor Business Plan and Feasibility Study during the Evaluation Stage* usually appears due to an unclear description of the scope of a project due to an improper feasibility study conducted during the evaluation stage. This results in the inability to develop a quality business plan, poorly defined goals and objectives, and unanswered questions about the scope of a solution and the gap between the specifications of the final product according to different shareholders. The benefits of a project are not clearly or adequately explained, resulting in the project budget being wrongly estimated [14].

The risk factor **R9** - *Insufficient Communication between Stakeholders* includes ineffective internal communication among project stakeholders as a whole. This results in adverse outcomes. A lack of communication that causes mismatched user and developer requirements leads to a catastrophe [18].

The risk factor **R10** - *Lack of Requisite Knowledge, Training and Skills amongst Team Members* is related to a project team lacking technical, leadership, and project management skills. This may be due to a lack of the following: training, knowledge in a specific domain and/or relevant experience [18, 27].

The risk factor **R11** - *Weak Commitment of Project Team* is also related to human resources, in particular staff turnover, a lack of commitment or motivation in the project team, and performance issues. Such risks increase the cost of re-hiring and onboarding and the probability of issues regarding the comptency of teams [10]. The duration of a project has a significant impact on team performance and team members' willingness to become involved and remain committed to a project.

3. Methodology

A structured questionnaire was used to obtain information from practitioners regarding the project risks that they observed. An online questionnaire was created [20], targeting the community of IT project managers and members. The survey had two sections. The first section dealt with the profile of a respondent. The second section focused on the perception of the severity and probability of the occurrence of the eleven listed risk factors in IT projects. The author used a five-point Likert scale for assessing the severity and a seven-point scale for assessing the probability, with 1 denoting extremely low and 7 denoting extremely high. The respondents were asked to select the most appropriate rating based on their experience for each factor.

3.1. Sampling

Purposive sampling ensures that the investigator collects informative views of members of the target population. In this investigation, a random snowball sampling technique was applied to leverage informants to recruit similar project practitioners to participate in the survey. The author selected the initial batch of target respondents using expert judgment based on members of the target population in the immediate social network. These subjects were encouraged to use their expert judgment to recruit participants with the appropriate profile for the survey. These steps were repeated until the required sample size was obtained. The study adopted this sampling method because it is difficult for a researcher to locate the population of interest (a homogeneous group), and compiling a list of the population is impractical [7]. The target population was made up of experienced PMs, program managers, project directors, and other members of IT project teams.

3.2. Data collection

A total of 115 complete responses were obtained with an overall response rate of 76.7%. The collected responses were subjected to a quality check to remove fake, improper, and inconsistent responses; Two out of 115 responses were removed. The majority of respondents had many years of experience in project management. 60% of the respondents had more than ten years of such experience, and 79% had more than five years of such experience. Other than IT projects, 8% of the respondents have different industry project management experience. Malaysia (MY) and Singapore (SG) accounted for $38 : 62$ per cent of the respondents. The sample size was calculated on the basis of the z-score [13], with the target population set at 150 with an expected sampling size of 109, the confidence level was set at 95% with a marginal error of 5%. The profiles of the survey respondents are summarized in Table1.

Comparing the 113 valid responses obtained to other risk management research, the sample appears to be of appropriate size and representative. For example, 57 responses were obtained in Liu et al.'s study [17]. Rahman and Kumaraswamy [22] received 92 responses in their research on cooperative risk management; in El-Sayesh's [6] risk assessment study, 70 responses were obtained.

Table 1. Profiles of survey respondents

Category	Respondents Frequency	%
Role		
President/CEO	1	.9
Vice President	4	3.5
Director	14	12.4
Senior Manager /Manager/PM	54	47.8
Department Head	9	7.9
Supervisor	2	1.8
Executive	8	7.1
Professional Consultant	15	13.3
Staff	5	4.4
Others	1	.9
Project Type		
IT	104	92.0
Non-IT	9	8.0
Length of Experience as PM		
10 years or more	68	60.2
5-10 years	22	19.5
Less than 5 years	23	20.3
Located in		
Malaysia (MY)	43	.38
Singapore (SG)	70	.62

Cronbach's alpha coefficient of reliability was calculated in SPSS to determine the consistency of the answers to the questionnaire. Table 2 shows that $\alpha = .884 (> .600)$, indicating that the answers are highly consistent [1]. The closer the coefficient is to 1.0, the more internally consistent the answers to the questionnaire.

Table 2. Reliability statistics

Cronbach's alpha	No. of Items
.884	11

3.3. Analytical techniques

This study attempts to advance the research on risk assessment using a four-step procedure of data analytics, as shown in Figure 1. The IBM Statistical Package for Social Sciences (SPSS) 28.0, Microsoft Excel 2019, and JASP version 0.16.0 were utilized to perform inferential statistical testing. Length of experience as PM is treated as an explanatory variable, divided into three categories: *ten years or more*, *five to ten years*, and *less than five years*.

The first step was to describe the assessments of the frequency and severity of the risk factors using descriptive statistics. The means of the scores on the Likert scale were then used to rank the individual risk factors in descending order according to impact and frequency of occurrence. In step three, Kendall's concordance analysis was deployed to determine the degree of agreement between respondents' perceptions within a group. The Kruskal–Wallis test is used in the fourth step to determine whether statistically significant differences exist between the assessment of the three groups.

Figure 1. Data analytics framework

3.3.1. Risk exposure score

Quantitative survey data give an aggregate image of the assessments of various respondents regarding risk exposure. Firstly, the data have to be reviewed to validate their completeness. Risk factors are rated using two Likert scales describing the likelihood of occurrence and degree of impact. Risk is defined as the likelihood of an unsatisfactory outcome (a.k.a. risk impact). The likelihood of occurrence multiplied by the potential loss from an unsatisfactory outcome is known as the risk exposure [2]. Equation (1) expresses the average product of each risk probability and its associated risk impact, which gives the mean risk exposure score [21].

$$\text{MeanRiskExposure}(RE) = \sum_{i=1}^{n} \frac{\text{RiskProbability}_i \cdot \text{RiskImpact}_i}{n} \tag{1}$$

3.3.2. Kendall's concordance test

A non-parametric measure, Kendall's coefficient of concordance (a.k.a. Kendall's W), describes the level of agreement among respondents on the mean risk exposure level. *W* lies in the range from 0 to 1, with 0 indicating complete disagreement and 1 indicating perfect concordance [4]. A significant value of W (p-value $< .05$) rejects the null hypothesis of a lack of concordance in ranking risk factors among respondents within a single group. Equation (2) shows the formula for W, where S is the sum of the squares of the deviations of the mean rank given to a factor from the mean rank overall, n is the number of factors ranked, p is the number of respondents, and T is a correction factor for the number of tied ranks [16].

$$W = \frac{12S}{p^2(n^3 - n) - pT} \tag{2}$$

3.3.3. Kruskal-Wallis test

The Kruskal Wallis test determines whether there is a significant difference between the median assessments of k groups, where $k \geq 2$ using equation (3) [9]. This is the equivalent of one-way ANOVA in parametric testing. When there are at least three groups and a significant difference is found, post-hoc testing is required to identify the nature of any differences between groups. N is the total number of respondents, r_i^2 the sum of the squared ranks in the ith sample, n_i is the size of the ith sample. If the result of this test is significant (p-value $< .05$), this indicates that there is a statistically significant difference between the three sample medians, i.e. the null hypothesis that all medians are equal should be rejected.

$$H = \frac{12}{N(N+1)} \sum_{i=1}^{k} \frac{r_i^2}{n_i} - 3(N+1) \quad (3)$$

4. Data analysis and results

4.1. Descriptive statistics

The mean risk exposure score ranges is $15.009 \leq M \leq 21.611$, with individual scores varying from 2 to 35 ($N = 113$), with a range of $15 \leq Mdn \leq 20$ for the median exposure score. The standard deviation range is $5.698 \leq SD \leq 7.402$. The p-value associated with the Shapiro–Wilk for normality was < 0.05, indicating that the risk exposure score was not normally distributed. This is due to the data being ordinal. However, further data analysis conducted for each risk factor indicated that the distribution of the risk exposure score is reasonably similar to a normal univariate distribution, since the value of the symmetry and kurtosis measures were between ± 2 [8].

Table 3. Descriptive statistics for risk exposure scores

Descriptive Statistics	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11
Valid	113	113	113	113	113	113	113	113	113	113	113
Missing	0	0	0	0	0	0	0	0	0	0	0
Median	20.000	20.000	20.000	15.000	20.000	20.000	16.000	18.000	20.000	16.000	20.000
Mean	19.973	21.611	19.283	15.009	21.204	19.726	16.124	18.982	20.637	17.150	19.602
Std. Deviation	6.450	5.799	7.402	5.989	6.884	6.759	6.087	6.620	6.866	5.698	6.054
Kurtosis	-.077	.233	-.407	-.075	-.647	-.296	.048	-.158	-.258	-.257	.057
Std. Error of Kurtosis	.451	.451	.451	.451	.451	.451	.451	.451	.451	.451	.451
Shapiro-Wilk	.964	.950	.957	.967	.951	.964	.952	.957	.959	.962	.957
p-value of Shapiro-Wilk	.004	<.001	.001	.007	<.001	.004	<.001	.001	.002	.003	.001
Minimum	5.000	8.000	4.000	2.000	8.000	6.000	5.000	4.000	5.000	4.000	8.000
Maximum	35.000	35.000	35.000	30.000	35.000	35.000	35.000	35.000	35.000	30.000	35.000

4.2. Risk ranking

The widely accepted approach of risk ranking is based on the value of the average risk exposure calculated using equation (1). The risk factor ranking was organized in descending order based on the average value of the risk exposure scores listed in Table 4. Among the whole set of respondents, the three contributory risk factors with the highest exposure scores were: **R2** (underestimated cost and time), **R5** (poor management of requirements), and **R9** (insufficient communication between stakeholders). The p-value of the Shapiro-Wilk was significant, indicating that the risk exposure score was not normally distributed. For this reason, non-parametric testing was selected.

The respondents from both countries (Malaysia and Singapore) have a consistent view of the top two and bottom three risk factors. The ranking from third to eighth differed slightly according to country. The Malaysian respondents ranked the risk from **R2**, **R5** and **R8** significantly higher than respondents from Singapore, possibly because these risks are more likely to occur in Malaysia.

Risks levels were categorized using a risk matrix (Figure 2). A mean risk exposure value greater than 18 is categorized as "high". Values above ten and less than 18 are categorized as "medium", and values below ten are classified as "low". Eight risk factors were considered to be "high" and three to be "medium". Normally, "high" category risks require developing a response plan, and "low" category risks are placed on a "watch list".

4.3. Results of Kendall's test for concordance

Kendall's concordance test was conducted to measure the level of agreement among respondents on the mean risk exposure scores within each of the three groups: respondents with *ten years or more* (*>10*

Table 4. Ranking of risk factors

ID	Risk Factor	MY+SG Mean	MY+SG Rank	MY Mean	MY Rank	SG Mean	SG Rank
R2	Underestimated Costs and Time	21.611	1	22.744	1	20.914	1
R5	Poor Management of Requirements	21.204	2	22.140	2	20.629	2
R9	Insufficient Communication between Stakeholders	20.637	3	20.791	4	20.543	3
R1	Change in Project Scope	19.973	4	20.907	3	19.400	6
R6	Poor Stakeholder Management	19.726	5	20.186	6	19.443	4
R11	Weak Commitment of Project Team	19.602	6	20.070	7	19.314	7
R3	Lack of Top Management Governance and Sponsorship	19.283	7	19.070	8	19.414	5
R8	Poor Business Plan and Feasibility Study during Evaluation Stage	18.982	8	20.444	5	18.014	8
R10	Lack of Requisite Knowledge, Training, and Skills amongst Team Members	17.150	9	17.767	9	16.771	9
R7	Lack of Methodology for Project Management	16.124	10	17.186	10	15.471	10
R4	Project is too Large and Complex	15.009	11	16.233	11	14.257	11
	Number (N)	113		43		70	
	Kendall's (W)	.143		.159		.144	
	Chi-Square (χ^2)	161.749		68.228		100.520	
	Degrees of Freedom (df)	10		10		10	
	Level of Significance (p)	.000		<.001		.000	
	Chi-Square Critical Value ($\alpha = .05$)	18.307		18.307		18.307	

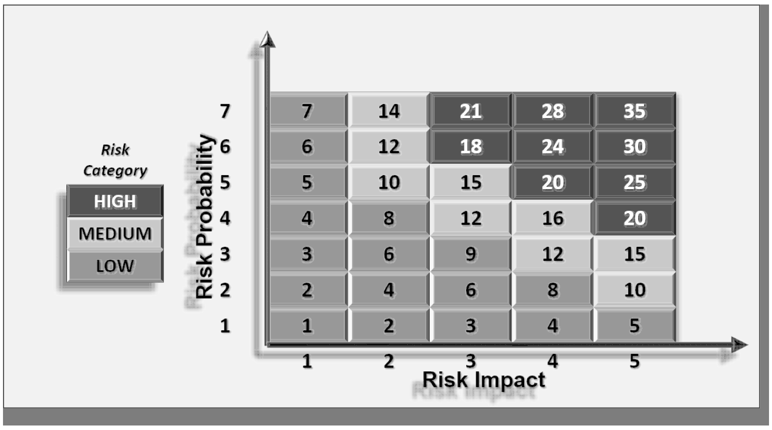

Figure 2. Risk matrix

years) PM experience vs *five to ten years* (*5-10 years*) PM experience vs *less than five years* (*<5 years*) PM experience. Based on Table 5, experience in PM significantly influences the ranking of the risk factors. For the respondents with >*10 years* of PM experience, the coefficient of concordance $W = .149$, $\chi^2(10, N = 68) = 101.506$, $p < .001$ was statistically significant. This indicates that the assessments of respondents in the >*10 years* group were associated (concordant) with each another. For the group with *5-10 years* of PM experience, the value of $W = .211$, $\chi^2(10, N = 21) = 44.382$, $p < .001$. This indicates that the assessments of the respondents within the *5-10 years* group were concordant. Similarly, for respondents with <*5 years* of PM experience, the of $W = .158$, $\chi^2(10, N = 24) = 37.860$, $p < .001$ was statistically significant. This indicates that the rankings of risk exposure within the <*5 years* group were correlated. The *5-10 years* group of respondents has the highest level of concordance (internal agreement) among respondents on mean risk exposure scores, followed by the <*5 years* group of respondents, then the >*10 years* group.

These results provide a few insights. Firstly, lesser experienced PMs assessed risks very differently from more senior PMs and gave lower risk exposure scores. As PMs accumulated more experience (e.g., *5-10 years* and >*10 years* respondents) and gradually developed their skills and knowledge in managing

Table 5. Ranking of risk factors according to experience and Kendall's test for concordance (MY+SG)

ID	Risk Factor	>10 years Mean Rank	>10 years Rank	5-10 years Mean Rank	5-10 years Rank	< 5 years Mean Rank	< 5 years Rank
R2	Underestimated Costs and Time	7.71	1	8.5	1	6.90	4
R5	Poor Management of Requirements	7.06	2	7.9	2	6.96	2
R9	Insufficient Communication between Stakeholders	6.76	3	6.50	4	7.83	1
R3	Lack of Top Management Governance and Sponsorship	6.50	5	5.19	8	5.13	8
R1	Change in Project Scope	6.18	7	7.57	3	6.44	5
R6	Poor Stakeholder Management	6.63	4	4.93	9	6.94	3
R11	Weak Commitment of Project Team	6.36	6	6.05	5	6.42	6
R8	Poor Business Plan and Feasibility Study during Evaluation Stage	6.00	8	5.55	6	6.27	7
R10	Lack of Requisite Knowledge, Training, and Skills amongst Team Members	4.73	9	5.40	7	4.90	9
R7	Lack of a Methodology for Project Management	4.11	10	4.50	10	4.42	10
R4	Project is too Large and Complex	3.97	11	3.90	11	3.81	11
	Number (N)	68		21		24	
	Kendall's (W)	.149		.211		.158	
	Chi-Square (χ^2)	101.506		44.382		37.860	
	Degrees of Freedom (df)	10		10		10	
	Level of Significance (p)	.000		<.001		<.001	
	Chi-Square Critical Value ($\alpha = .05$)	18.307		18.307		18.307	

risks, the top three ranked risk factors changed appropriately. The ranking from first to third changed from **R9**, **R5**, and **R6** to **R2**, **R5**, and **R1** and eventually to **R2**, **R5**, and **R9**. Among the senior PMs, who have acquired substantial experience and knowledge and are skilled in managing changes in project scope, the ranking of these risk factors coincides with the overall risk ranking according to the respondents as a whole. This finding indicates that a PM's assessment of risk is dependent on his/her length of PM experience. More senior PMs tend to give high priority to the risk factors **R2**, **R5**, and **R9**.

More experienced PMs tend to have a more consistent pattern of risk assessment than junior PMs. Among the Malaysisan respondents with *>10 years* of PM experience, (Table 6), the coefficient of concordance $W = .190$, $\chi^2(10, N = 24) = 45.525$, $p < .001$ was statistically significant. This indicates an association between the assessment of respondents within the *>10 years* group. There was a correlation between the assessments of respondents in the *5-10 years* group, as indicated by the coefficient of concordance $W = .172, \chi^2(10, N = 10) = 17.165$, $p < .001$. Additionally, the coefficient of concordance for the group of respondents with *<5 years* of PM experience was $W = .225, \chi^2(10, N = 9) = 22.982$, $p = .001$. This is statistically significant, suggesting that assessments of the respondents in the *<5 years* group were correlated.

Table 7 shows the results of Kendall's test of concordance test for the respondents from Singapore. For the respondents with *>10 years* of PM experience, the degree of concordance $W = .152$, $\chi^2(10, N = 44) = 66.804$, $p < .001$ was statistically significant. This indicates that the assessments of these respondents were associated (related) to each another. For the respondents with *5-10 years* of PM experience, the degree of concordance $W = .265, \chi^2(10, N = 11) = 29.175$, $p < .001$ indicated that the assessments of the respondents in this group were related. A similar degree of concordance was found among respondents with *<5 years* of PM experience $W = .153$, $\chi^2(10, N = 15) = 23.004$, $p = .001$, suggesting that the assessments of this group were correlated. More experienced PMs tend to have a more consistent view than junior PMs.

Table 6. Ranking of risk factors and Kendall's test of concordance (MY)

ID	Risk Factor	>10 years Mean Rank	Rank	5-10 years Mean Rank	Rank	< 5 years Mean Rank	Rank
R2	Underestimated Costs and Time	8.13	1	8.00	1	7.78	2
R5	PoorManagement of Requirements	7.33	2	7.90	2	7.17	3
R8	Poor Business Plan and Feasibility Study during Evaluation Stage	5.81	8	6.75	4	8.67	1
R3	Lack of Top Management Governance and Sponsorship	6.31	6	5.00	9	3.44	11
R11	Weak Commitment of Project Team	6.31	5	7.45	3	6.72	4
R1	Change in Project Scope	6.04	7	5.50	6	6.67	5
R6	Poor Stakeholder Management	6.50	4	5.95	5	5.50	7
R9	Insufficient Communication between Stakeholders	7.08	3	5.25	7	6.22	6
R10	Lack of Requisite Knowledge, Training, and Skills amongst Team Members	4.90	9	5.10	8	4.89	8
R7	Lack of Methodology for Project Management	3.75	11	4.85	10	4.67	9
R4	Project is too Large and Complex	3.83	10	4.25	11	4.28	10
	Number (N)	24		10		9	
	Kendall's (W)	0.190		0.172		0.255	
	Chi-Square (χ^2)	45.525		17.165		22.982	
	Degrees of Freedom (df)	10		10		10	
	Level of Significance (p)	<.001		.071		.011	
	Chi-Square Critical Value ($\alpha = .05$)	18.307		18.307		18.307	

4.4. Results of Kruskal-Wallis test

The results of the Kruskal-Wallis test (Table 8) revealed that there were no significant differences in the median assessment of risk exposure in the three groups of respondents (*>10 years*, *5-10 years*, and *<5 years*) collectively ($0.029 < H(2) < 4.456$, $p > .05$ in all cases). These results suggest indicate that there are no significant differences between the assessments of risk exposure according to the length of experience.

In addition, the results of the Kruskal-Wallis test for the Malaysian respondents, shown in Table 9, indicate that there are no significant differences in the assessment of risk exposure according to experience ($0.064 < H(2) < 5.159$, $p > .05$ in all cases).

Table 10 presents the results of the Kruskal-Wallis test for the respondents from Singapore. In the majority of cases, there are no significant differences in the assessment of risk exposure according to experience, with the exception of **R2** and **R6**. Among respondents with *5-10 years* of experience, the assessments of **R2** are less consistent, whereas the assessments of **R6** are more diverse. These results also suggest that assessments are associated with the level of experience in Singapore.

5. Discussion

This study analyzed eleven critical factors of project risk through an empirical online quantitative survey. A snowball data collection strategy collected 115 responses from a target population of 150 PMs in the Malaysia-Singapore region. Respondents were expected to fill in three sections of the survey (section A: demographics, Section B: severity of risk, and Section C: frequency of occurrence). These responses were used to calculate and the rank risk exposure scores, followed by inferential statistical testing to analyze the effect of experience on the assessment of risk exposure.

The primary objective of obtaining an overall ranking of risk exposure based on the collected data was achieved. The following are the key findings of this paper:

1. The three most prominent risk factors based on risk exposure scores based on the survey were:

Table 7. Ranking of risk factors and Kendall's test of concordance (SG)

ID	Risk Factor	10 years > Mean	Rank	5-10 years Mean	Rank	<5 years Mean	Rank
R2	Underestimated Costs and Time	7.48	1	8.95	1	6.37	5
R5	Poor Management of Requirements	6.91	4	7.91	2	6.83	4
R8	Poor Business Plan and Feasibility Study during Evaluation Stage	7.27	2	6.27	4	7.33	1
R3	Lack of Top Management Governance and Sponsorship	6.60	5	5.36	8	6.13	8
R11	Weak Commitment of Project Team	6.11	7	7.68	3	6.27	7
R1	Change in Project Scope	6.94	3	4.41	9	7.10	2
R6	Poor Stakeholder Management	6.28	6	6.14	5	6.97	3
R9	Insufficient Communication between Stakeholders	5.41	8	5.82	6	6.30	6
R10	Lack of Requisite Knowledge, Training, and Skills amongst Team Members	4.64	9	5.68	7	4.90	9
R7	Lack of a Methodology for Project Management	4.31	11	4.18	10	4.27	10
R4	Project is too Large and Complex	4.05	10	3.59	11	3.53	11
	Number (N)	44		11		15	
	Kendall's (W)	.152		.265		.153	
	Chi-Square	66.804		29.175		23.004	
	Degrees of Freedom (df)	10		10		10	
	Level of Significance (p)	<.001		.001		.011	
	Chi-Square Critical Value ($\alpha = .05$)	18.307		18.307		18.307	

Table 8. Kruskal-Wallis test (MY+SG)

	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11
Kruskal-Wallis (H)	.775	3.322	3.142	.029	.550	4.456	.211	.955	2.730	0.470	0.306
Degrees of Freedom (df)	2	2	2	2	2	2	2	2	2	2	2
Number (N)	113	113	113	113	113	113	113	113	113	113	113
Level of Significance (p)	.679	.190	.208	.986	.759	.108	.900	.620	.255	.791	.858

Table 9. Kruskal-Wallis test (MY)

	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11
Kruskal-Wallis (H)	.687	.419	2.839	1.521	.064	1.251	1.249	1.459	5.159	.380	.237
Degrees of Freedom (df)	2	2	2	2	2	2	2	2	2	2	2
Number (N)	43	43	43	43	43	43	43	43	43	43	43
Level of Significance (p)	.709	.811	.242	.467	.969	.535	.536	.482	.076	.827	.888

Table 10. Kruskal-Wallis Test (SG)

	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11
Kruskal-Wallis (H)	.113	6.203	1.056	1.03	.935	6.198	.294	.261	3.233	.208	1.414
Degrees of Freedom (df)	2	2	2	2	2	2	2	2	2	2	2
Number (N)	70	70	70	70	70	70	70	70	70	70	70
Level of Significance (p)	.945	.045	.590	.598	.626	.045	.863	.877	.199	.901	.493

R2 (underestimated cost and time), **R5** (poor management of requirements), and **R9** (insufficient communication between stakeholders).

2. The findings of Kendall's test of concordance indicate that the group of respondents with >*10 years* of PM experience had a different view and concerns about these risk factors in comparison to those with <*5 years* of PM experience. This phenomenon can be explained by the PM having developed competence over time. As the PM gains experience, his/her assessment of the severity and frequency of risk factors will evolve and become more accurate.
3. Junior PM's assessments of risks have a larger variance than more senior PMs and tend to result in a lower risk exposure score.

4. Senior PMs have more unified and consistent rankings of project risk.
5. Respondents from both Malaysia and Singapore exhibited similar patterns of risk assessment. They both acknowledged **R2** and **R5** to be the top two risk factors, and the bottom three to be **R10**, **R7**, and **R4**. The findings are consistent with risk assessment being dependent on a practitioner's level of experience.

PMs are advised to conduct a risk assessment periodically with relevant stakeholders, monitor and track each high-risk exposure item, develop a risk response plan accordingly and follow through till project closure. The results indicate that a PM's experience influences such risk assessment. Managers should be mindful of the bias in risk assessment typically generated among junior team members. Practitioners can use this study's findings to include key intrinsic project risk factors in their risk log.

6. Conclusion

Studying contributory risk factors is imperative to delivering a successful project to meet the triple constraint model. PMs proficient in risk management have better control over project outcomes by anticipating potential issues. This study has analyzed how PMs in this region perceived and assessed these risks according to their experience level. The three most significant IT project risks, in descending order, were **R2**, followed by **R5** and **R9**. If these top-ranked risks are appropriately classified and managed proactively, the success rate of projects is expected to improve. In this study, senior PMs had more consistent risk assessments. The findings revealed that risk assessment depends on the level of experience of a PM.

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